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REPORT  
Provincial Board of Health  
ONTARIO  
1899

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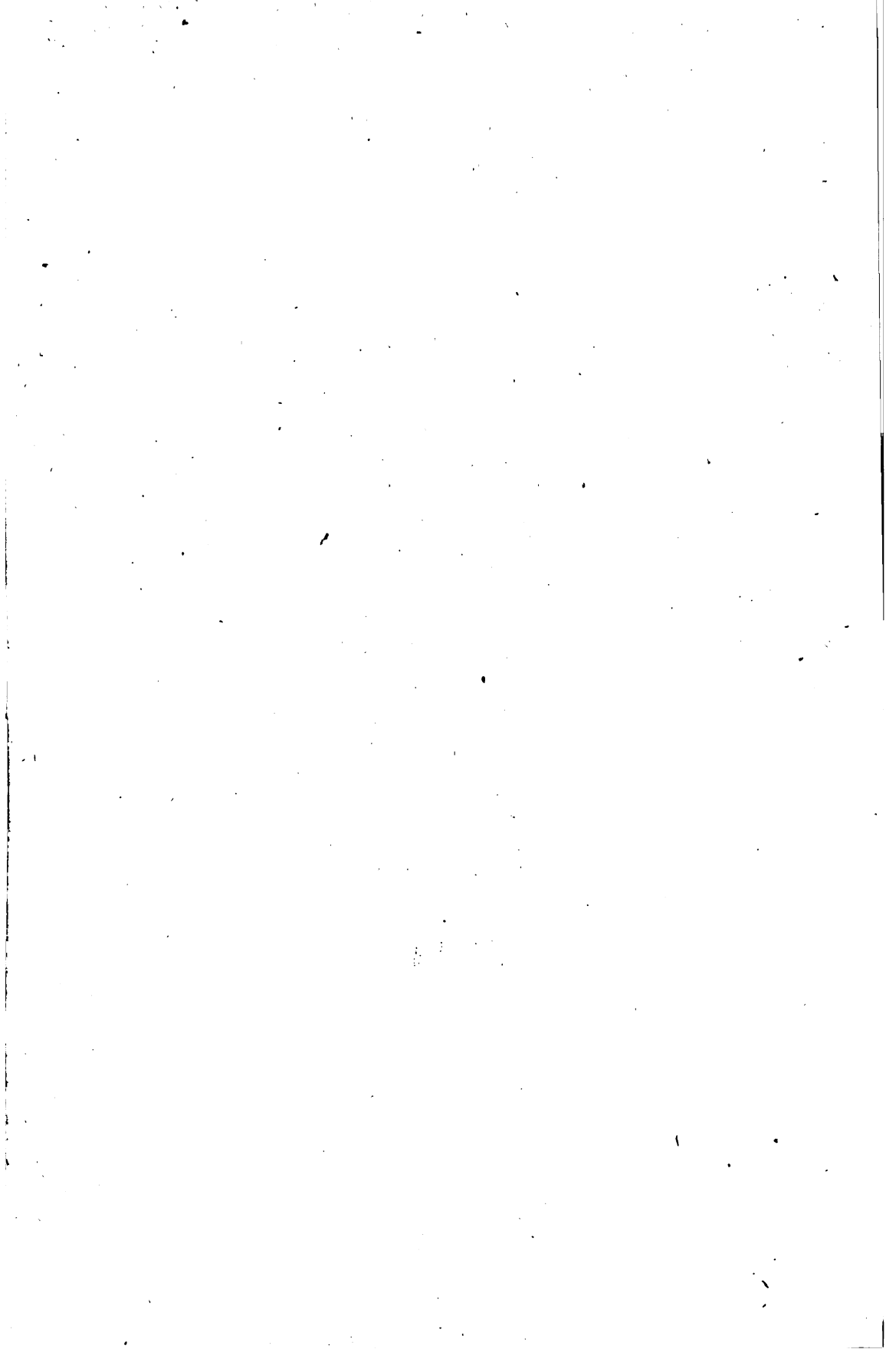


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FROM

Board of health,  
Province of Ontario.

10 Sept. 1901.





EIGHTEENTH ANNUAL REPORT  
OF THE  
PROVINCIAL BOARD OF HEALTH  
OF ONTARIO  
BEING FOR THE YEAR  
1899.

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PRINTED BY ORDER OF  
THE LEGISLATIVE ASSEMBLY OF ONTARIO.

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# CONTENTS.

	PAGE.
Introduction .....	1
Report of Secretary .....	5-26
Chapter I.—Communicable Diseases in Ontario .....	5-12
Table showing Deaths from Communicable Diseases in 1899.....	5
Smallpox, and Variations in its Types.....	6
Its Pandemicity illustrated by Statistics.....	6
Table showing Cases and Deaths from Smallpox in Ontario in 1899.....	7
Table illustrating Smallpox prevalence in United States.....	7-8
Table showing Influence of Vaccinal Protection .....	8
Diphtheria prevalence in Province .....	9
Table showing Decline of Diphtheria in Ontario in eleven years .....	10
Table showing Decline in Diphtheria in different foreign cities in five years .....	10
Scarlatina prevalence and Dangers of Sequelæ .....	10
Table giving Distribution of Typhoid in Ontario in 1899 .....	11
Population of Cities, Towns and Villages .....	11
Abatement of Nuisances in Municipalities.....	12
Chapter II.—Ventilation and Heating of Public Buildings .....	12-18
Slow Progress in Application of its Principles and Reasons therefor .....	12-13
Standard requirements .....	13
Estimated Value in Heat Units of Different Substances.....	14
Variations in Cost and Efficiency in School Ventilation in Scotland.....	14
Conditions Governing Methods of Ventilation in Schools in Massachusetts .....	15
Problem of Ventilation Defined and Example given .....	16
Size of Ventilating Ducts, and Size and Diameter of Fans.....	17
Example of Application of Principles and Costs of Fuel to a given case.....	17
Some of the Massachusetts Plans of Ventilating Schools Illustrated .....	18
Chapter III.—Economic Value of Sanitation as a Measure and Means of Social Progress. ....	18-26
The Goal of Society Defined, by Dr. J. B. Crozier, London .....	18
The Underlying Conditions of Human Progress Defined.....	19
Condition of England in Social Sphere in 1815.....	20
Rapid Removal of Social Wrongs with Scientific Progress, 1815-1838.....	20
First Organized Steps toward Sanitary Progress in Lord Russell's Royal Commis- sion .....	21
Statistics showing Deaths from Communicable Diseases in 1838 to 1897.....	21
Social Conditions of Working Classes in 1838 Illustrated .....	21
First Medical Officer of London Appointed, 1849 .....	22
Sanitary Conditions in London in 1854 Illustrated .....	22
Scientific Research in Public Medicine begun, 1865 .....	22
Dr. John Simon's Report, 1868, states the Intent of English Law .....	23
Dr. Burdon Sanderson's Investigations into Zymotics.....	23
Dr. John Simon urges Municipal Development of Public Health Work.....	23
Consolidation of English Public Health Laws, 1874.....	24
Ontario Public Health Act passed, 1884.....	24
Decline of Communicable Disease in Ontario in fifteen years illustrated.....	24
Dangers in Modern Social Conditions referred to.....	25
Ideal of Public Health Work defined.....	25-26
Report of Laboratory Work of the Board in 1899, by Dr. J. J. Mackenzie .....	27-33
Table giving total specimens examined .....	27



Chapter III.— <i>Con.</i>	PAGE.
Number of Municipalities Sending Specimens .....	27
Tuberculosis, Examination of, with table giving results .....	27-28
Table of Cases showing Cough and Expectoration and no other signs .....	27
“ “ “ “ and Pyrexia.....	28
Examination for Diphtheria and Typhoid Specimens .....	29
“ Cerebro-spinal Meningitis .....	29-30
Diseases of Animals—Rabies, Anthrax, Black Shoulder .....	30-31
Bacteriological Examination of Waters .....	31-32
Miscellaneous Investigations.....	31-33

## PART II.

Chairman's Annual Address, by Dr. J. D. Macdonald.....	15-16
Report of Committee on Epidemics :	
1. Third Quarter, containing Report on Oil Refinery at Sarnia and Cattle Yard Nuisances .....	16-19
4. Fourth Quarter, containing Reference to Congress for Tuberculosis at Berlin..	19-21
5. Report for First Quarter, 1900, containing Reference to Smallpox Types and Bubonic Plague .....	21-25
Report on Smallpox in Prescott County, by Dr. J. G. Hodgetts, Inspector .....	25-28
Report on Smallpox in Essex, by Dr. J. G. Hodgetts, Inspector .....	28-30
Report of Committee of American Public Health Association on Communicable Diseases, reference to Dissemination of Disease by Insects .....	30-33
Consumption in Ontario and Relation thereto of Medical Profession, an Address by Dr. P. H. Bryce before Huron Medical Association, with numerous new statistics.....	34-41
Report on Berlin Sewage Farm .....	41-42
Report on Smith's Falls Waterworks and Sewerage Scheme .....	42-43
Inspection of Muskoka Health Resorts, by Dr. P. H. Bryce.....	44-45
Report of Committee on School Hygiene, by Dr. J. J. Cassidy .....	48-50
“ Public Schools of Paris, by the Secretary .....	50-51
“ on G.T.R. Cattle Yards at Thamesville.....	51-52
“ re Ventilation of Brsss Work Shops .....	53
Annual Reports of Local Boards of Health, including Belleville, Brantford, Chatham, Hamilton, London, Ottawa, Stratford, St. Catharines, Windsor .....	53-72
Summary of Annual Reports of Local Municipalities by Counties .....	72-83

EIGHTEENTH ANNUAL REPORT

OF THE

PROVINCIAL BOARD OF HEALTH.

---

INTRODUCTION.

*To His Honour the Honourable SIR OLIVER MOWAT, K. G. M. G., Lieutenant-Governor of Ontario.*

MAY IT PLEASE YOUR HONOUR :

The Provincial Board of Health hereby presents its Eighteenth Annual Report, and has again the satisfaction of reporting that throughout Ontario there has been enjoyed a fair condition of healthfulness. Diseases of the nature commonly spoken of as epidemic and infectious have appeared on some occasions within our borders. Typhoid fever and diphtheria seem to be ever present to a limited extent amongst us, and phthisis still has its many victims. Smallpox also, of both severe and mild types, has appeared for a time in districts opposite the American frontier, having been introduced into the Province from the United States. A few instances of it have also appeared in other localities removed from the frontier, as Brantford and Toronto ; but toward the end of the year it has everywhere been of a character of unusual mildness, due, some believe to the immunity inherited from a nearly universal protection from it by vaccination in past generations of the populations among which it appeared. On the Quebec border also the disease has appeared, it having been there introduced also from the United States. Wherever those diseases were reported to have appeared measures were taken by the Provincial Board of Health to limit their prevalence, and it may be stated with satisfaction that the efforts of the Board have been successful.

The Board would again desire to notice the very infectious and everywhere present consumption, and again to bring under public notice what, so far, appears to be the only mode by which its prevalence may be limited, that is to say, by the establishment of "Homes for consumptives." It would seem that such homes should necessarily be at the public cost and under public supervision.

Respectfully submitted,

J. D. MACDONALD,  
Chairman.



# ANNUAL REPORT

## OF THE

# PROVINCIAL BOARD OF HEALTH

## OF ONTARIO.

### PART I.

### REPORT OF THE SECRETARY.

#### CHAPTER I.

#### COMMUNICABLE DISEASES IN ONTARIO IN 1899.

In conformity with the practice of many years, it again becomes my pleasurable duty to summarize, in my report to the Provincial Board of Health, the main features which have marked the public health of the Province during a past year. In a succeeding chapter I have indulged in a historic retrospect of the conditions, social and scientific, upon which the progress of public health during the century just closing has depended. With such a history, it will have been noticed in the *resumes* of progress presented for your consideration in the Reports of 1891 and 1897 that the work of this Board during nearly two decades has kept in close touch, and its results have, it would seem, been closely parallel with the progress of public health during the century.

During the year 1899, we have again to record a general high average of health, as may be seen in the table of deaths, recorded monthly by the division registrars of the 770 municipalities. The average percentage of returns made has been very high, both of population and of registrars recording. Hence comparison with the actual schedules returned to the Registrar-General at the end of the year will compare closely with these monthly returns.

*Deaths from Communicable Diseases, as per Monthly Reports made to the Registrar-General in 1899.*

	Scarlatina.	Diphtheria.	Measles	Whooping Cough.	Typhoid	Tuberculosis.	Total including Tuberculosis.	All other causes.	Grand total.	Average population reporting.
January..	23	48	5	9	22	184	294	1,864	2,154	2,222,504 97 % of total population.
February..	32	85	2	3	15	215	303	2,265	2,568	
March ....	36	25	2	9	17	235	324	2,037	2,361	
April .....	28	33	4	7	15	257	344	1,729	2,073	
May .....	17	18	3	7	18	230	292	1,474	1,767	
June .....	12	22	5	4	13	157	213	1,308	1,521	
July .....	7	20	4	6	15	178	230	1,413	1,643	
August....	8	25	5	16	55	172	281	1,807	2,088	
September..	10	21	0	8	55	190	234	1,683	1,967	
October ..	8	34	4	7	88	194	335	1,605	1,940	
November..	12	40	6	8	40	146	252	1,249	1,501	
December..	20	42	3	6	28	157	256	1,587	1,843	
Total....	213	363	43	90	381	2,315	3,409	20,021	23,426	
Rate per 1,000 per annum..	0.09	0.1	0.02	0.04	0.1	1.0	...	.....	10.0	

If we are to judge regarding the reduction of the total mortality for 1899, as compared with 1898, by the records of deaths from contagious diseases, the gratifying conclusion is arrived at that this year will show a total record of deaths lower than in 1898, as it was 1,527, as compared with 1,755 in 1897. That this is the case has been learned from the summary just completed of the returns for 1899, completed at this date of writing, the total deaths being 1,094. Amongst the more interesting facts that this almost continuous reduction of deaths from contagious diseases seems to teach us is that the supposedly widespread existence of—as Sir John Simon expressed it—*cosmical conditions* as promoting the pandemicity of disease plays an insignificant part. While we may believe such as still playing some part in epidemic appearances of various diseases, yet it is small as compared with the neglect to exercise those means directly within our control for limiting the spread of the ordinary communicable diseases. While the history of nearly two decades of public health work in Ontario makes it possible for us to say this, yet certain facts known to us with regard to the several diseases make it quite plain that there are to-day, as have been observed for two centuries, notable variations in the type of disease, due partly to seasonal, or perhaps cosmical cases, but rather, we think there is evidence to believe, depending more largely upon some personal element with its immediately local environment, which establishes the type of disease in an epidemic. It would seem, indeed, as if there are often present two contending forces, the personal and the climatic or cosmical, striving for the mastery. In no instance within the memory of the active health officer of to-day has this been more often illustrated than regarding smallpox.

*Smallpox and the types of smallpox.* Along with your Secretary there are members of the Board who have intimate knowledge of smallpox during the outbreaks of the past twenty years in Ontario. For purposes of comparative study it is of interest for us to go back to 1870, when the first pandemic within the period of modern sanitary organization made its appearance. Regarding it the Annual Report of the medical officer of health for England in 1874 stated "The epidemic of smallpox which began in England toward the close of 1870 and terminated in the second quarter of 1873 was part of a general epidemic outbreak of that disease, of world-wide diffusion, marked wherever it occurred by an intensity and malignity unequalled by any previous epidemic of the disease within living memory. Both in tendency to spread and in several of individual attacks it tested to the very utmost the value of such defences as had been provided against it by vaccination; killing the unvaccinated in far more than ordinary proportion; killing also in unusual proportion persons (especially those beyond the age of puberty) whose previous vaccination had been imperfect; and even prevailing more or less against many vaccination defences which would have borne the stress of any ordinary epidemic. The smallpox deaths in England during the 2½ years of this epidemic were 44,433 in number."

The pandemicity of the disease in those years shows itself in the mortality returns of Ontario, which are set forth diagrammatically in the report for 1898, by years and decades. The disease reached its height in 1874, one year later than in England, declining again but never disappearing, only to reach a climax in 1879. Since 1879 the total deaths in Ontario have been 167, while there were 195 in 1879 alone. During the past twenty years the type of disease has markedly varied. The first serious outbreak in 1884 in Hungerford began so mildly that for two months it was called by the physician in charge *black measles*; but in all there were 204 cases in one township alone and 33 per cent. of deaths, so rapidly did the type change and become more severe. It began in a practically unvaccinated French population. The succeeding year, 1885, witnessed the most terrible outbreak of the century, it beginning in Montreal in a series of mild cases not at first diagnosed as smallpox. For several months, from April to June, the disease was allowed to extend, in which latter month 22 deaths occurred. Including these 3,175 deaths occurred in Montreal alone during the latter six months of the year. Through the action of the Provincial Board of Ontario, set forth fully in the report for 1885, but 16 deaths occurred in 146 cases growing out of the Montreal epidemic, or 10.9 per cent. But two other outbreaks with high mortality have since occurred, one being a localized one in Elgin in 1889, with 49 cases and 13 deaths, and one in 1894 with 36 cases and 5 deaths, or 28.9 and 13.8 per cent. respectively. We are thus brought to the present year with the following record of cases and deaths:

*Smallpox in Ontario in 1899.*

County.	Municipality.	Cases.	Deaths.	Date of Occurrence by Quarters.
Leeds .....	Wolford Tp. ....	5	3	Winter Quarter.
Prescott .....	E. Hawkesbury Tp. ....	10	2	"
" .....	Vankleek Hill Town .....	5	2	"
Stormont .....	Osnabrock Tp. ....	10	3	"
" .....	Cornwall Town .....	1	0	"
Dundas .....	Williamsburg Tp. ....	4	2	"
Essex .....	Windsor City .....	1	0	"
" .....	Colchester Tp. ....	5	0	"
" .....	" .....	"	"	"
" .....	Walkerville Town .....	1	0	Summer Quarter
" .....	Sandwich E. Tp. ....	25	1	"
" .....	Belle River Village .....	2	0	Autumn Quarter.
" .....	Maldstone Tp. ....	30	0	"
" .....	Rochester Tp. ....	128	1	"
" .....	Tilbury W. ....	86	0	"
" .....	Tilbury N. ....	26	0	"
" .....	Sandwich S. ....	1	0	"
Kent .....	Tilbury E. ....	2	0	"
Middlesex .....	Caradoc Tp. ....	1	0	"
Lambton .....	Sarnia Town .....	2	0	"

Thus not only have we the difference between the 13 years preceding 1882 and the 17 years since of 886 deaths as compared with 147, but the generally less percentage of deaths in the latter period, down to the remarkably mild epidemic of the latter half of 1899. The actual statement of cases and deaths is seen in the table, and the difference between the cases in the earlier part of the year and the latter is very remarkable. The first fatal outbreak grew out of cases apparently so mild, amongst workmen on the Soul-anges Canal, near Montreal, in December, that no physician was called in for the first cases, and no mortality resulted. The Wolford outbreak, whose origin it has not been possible to discover, was of excessive virulence, the first victim being a dry goods clerk, exposed in no way except through goods, as far as known, yet who died, as well as his nurse and sister after him.

The cases in the townships of Essex present a history in every way parallel to many hundreds in the neighbouring States as may be illustrated from returns from various States for the period set forth in the following table. The whole preceding year has shown very similar outbreaks.

*Smallpox in United States during December 29th, 1899, to February 9th, 1900.*

	Cases.	Deaths.
Alabama .....	22	.....
Arkansas .....	60	8
California .....	3	.....
Colorado .....	15	.....
Delaware .....	(not given)	1
Washington .....	5	.....
Florida .....	12	.....
Georgia .....	119	.....
Illinois .....	49	4
Indian Territories .....	75	.....
Indiana .....	73	.....
Iowa .....	16	.....
Kansas .....	17	.....
Kentucky .....	26	.....

*Smallpox in United States during December 29th, 1899, to February 9th, 1900—Continued.*

	Cases.	Deaths.
Louisiana .....	772	87
Massachusetts .....	7	2
Minnesota .....	29	.....
Mississippi .....	153	9
Missouri .....	60	4
Nebraska .....	6	2
New York .....	8	.....
North Carolina .....	274	.....
Ohio .....	150	.....
Oklahoma .....	55	.....
Oregon .....	3	.....
Pennsylvania .....	11	.....
South Carolina .....	5	.....
Texas .....	252	3
Utah .....	11	.....
Washington Territory .....	117	2
West Virginia .....	26	.....
Wisconsin .....	7	1
Canada :		
Province of Quebec (14 Municipalities) .....	473	.....
New Brunswick .....	116	.....

As an illustration of the true character of this disease, the following synopsis of cases which occurred in West Tilbury is of much interest. It is a summary of facts in the outbreak of smallpox in November and December, 1899 by Dr. W. F. Bryans, physician in charge. The disease appeared in 11 houses, with 85 inmates. There were no deaths.

*Smallpox in Tilbury West Township in 1899.*

Family.	No. of Members.	Had Smallpox previously.	Had old cicatrices of previous vaccination.	Vaccinated at or about time of exposure.		Cases.
				Successful.	Unsuccessful.	
No. 1..	6	0	0	4	2	2 severe, 4 mild..... 6
" 2..	9	.....	3	6	0	6 took mild disease.. 6
" 3..	7	1	5	1	0	1 had mild attack... 1
" 4..	12	0	8	3	1	1 baby, semi-confluent 1
" 5..	6	0	1	0	5	5 took disease..... 5
" 6..	10	0	4	.....	6	6 took disease .....
" 7..	4	0	1	3	0	3 mild cases .....
" 8..	7	1	2 (not well marked).	0	4	6 cases .....
" 9..	6	0	2	0	4	4 cases .....
" 10..	9	1	3	0	5	5 cases .....
" 11..	9	1	2 (not well marked).	6	0	7 cases, mild .....
	85	4	31	25	27	48

Thus of 4 with previous smallpox, all escaped ; of 28, with good old cicatrices, all escaped ; of 3, with poor old cicatrices, all took disease mildly ; of 20 vaccinated successfully, all took disease in mild form ; of 27 unvaccinated, all took disease. And it was apparent that vaccine if in some cases used on the unvaccinated early enough to protect was probably too attenuated to do more than modify the disease with which in many cases it ran concurrently

These two outbreaks are referred to in detail in the quarterly report of the Committee on Epidemics of the Provincial Board of Health, dated Feb. 14th, 1900, are found in Part II, of this Report. That report concluded as follows :—

"There is on the statute book a law making it compulsory that the council of every municipality shall from year to year appoint public vaccination stations and vaccinators, and that every child within three months of birth must be vaccinated and a certificate of successful vaccination be produced, under penalty.

This Board may or may not feel that it has done all in its power to have this statute carried out. The fact stands that the law in this regard is practically a dead letter. Thus we have demonstrated once more that the very force inherent in preventive medicine is the very means destructive of its imperative influence and acceptance by the general public. The public cease to fear the gods, unless they punish.

Regarding vaccination, we have a right to appeal to the public conscience of Ontario, where our people have seen the world's most frightful disease practically banished, in the words of Kipling's "Recessional"—a true prayer for the people—

"Lest we forget! Lest we forget!"

But the practical action for the Provincial Board to carry out is that, knowing these facts *re* vaccination, knowing smallpox as we know it in all its horrors as well as its vagaries, the Board shall not for a single instance, through fear of a popular cry based upon lack of knowledge and forgetfulness of the tear-stained pages of even a quarter of a century of history, fail to deal with the disease in the only way left open to it, and to encourage all physicians, not one in a hundred of whom of the younger men have seen a single case of smallpox, to call for assistance in diagnosing all suspicious cases, and when once diagnosed isolate immediately, vaccinate all exposed persons and insist while the danger is imminent upon a general vaccination of the public.

This, and only this, as we have seen in the record of the last ten years, has preserved the public health, and the dignity of a scientific truth transmitted by the immortal Jenner and maintained only after unremitting labor.

As with Sir Humphrey Davy's safety lamp for the miners, the people may never learn the scientific principles by the application of which in a few weeks he discovered that life-giving apparatus, so vaccination, like it, has carried its beneficial influence through the century, and will so continue to the end."

"Truth crushed to earth shall rise again;  
The eternal years of God are hers;  
But error, wounded writhes in pain  
And dies among his worshippers."

**2. DIPHTHERIA OUTBREAKS.** There has been nothing more gratifying in the history of the progress of preventive medicine during the past decade than the change which has taken place both in the definite knowledge of the causes and relationship of this disease and the means of its prevention and cure. Yersin and Roux, in France, began just ten years ago those remarkably exact experiments which have taught us to discriminate between diphtheria and pseudo-diphtherias, which have enabled us, through the microscope and culture methods, to determine the nature and degrees of danger from mixed infections, and which latterly, through the remarkable studies of Westbrook, have shown us that the bacterial flora of the buccal and nasal tract presents differences in species, in variety, in activity of their toxic products, and the stages of their development, hitherto quite unknown, if not unsuspected.

But alongside of such knowledge has been an equally great progress in the application of the principles of serum therapy through the development of the methods of manufacture of the antitoxin of the virus of the disease. Doubt as to its utility and mistrust as to its possibly injurious effects have practically disappeared, and it has become possible to print the results of these glorious achievements in statistics of a decreasing mortality.

The following extract is taken from the Report of Birth, Marriages and Deaths in Ontario for 1898, published in 1900:—

"The total deaths from diphtheria and croup in 1898 were 634, as compared with 976 in 1897. There is no disease in which the progress of preventive medicine has been



more marked than in diphtheria during the past ten years. The following table of deaths in Ontario in successive years is illustrative :—

*Table showing Deaths from Diphtheria and Croup in Ontario.*

1887.....	1,786	1893.....	1,044
1888.....	1,489	1894.....	1,075
1889.....	1,101	1895.....	942
1890.....	893	1896.....	926
1891.....	955	1897.....	976
1892.....	890	1898.....	634

The remarkable falling off so pronounced in 1898 must doubtless be due to various influences, amongst which primarily may be placed the greatly increased knowledge amongst the people of its extremely contagious character, and the greater activity of the Local Boards of Health in suppressing outbreaks ; secondly, to the seasonal influences peculiar to the year 1898, but especially to the greatly increased use by physicians of antitoxin, both in a curative and a preventive way. Comparisons with other states and countries have been made in previous tables, but the following reductions in deaths since 1894 in the various cities will especially illustrate the decrease due to the last cause, since the use of antitoxin in America only began with 1895, while in France and Germany it was much used in 1894 :—

*Decrease in Deaths from Diphtheria in Different Cities.*

City.	1894.	1895.	1896.	1897.	1898.
New York.....	2,258	1,634	1,555	1,377	992
Boston.....	817	588	516	411	170
Chicago.....	841	1,775	955	702	622
Paris, France.....	1,109	421	444	298	259
Cities of Massachusetts, including Boston (pop. 1,611,780).....	1,376	1,484	1,348	1,107	507
Berlin, Germany.....	1,361	934	515	507	608
London, Eng.....	2,670	2,316	2,643	2,263	1,772
Toronto.....	110	147	132	161	63
Hamilton.....	72	11	14	19	22
Ottawa.....	124	78	41	44	32
London.....	48	9	10	20	11
Kingston.....	5	26	21	12	3
Brantford.....	10	18	10	8	2
St. Thomas.....	1	8	19	12	3
Chatham.....	12	5	4	1	2

The annual reports of Local Boards of Health, as well as references in the quarterly reports indicate that there still occur isolated outbreaks which tend to become epidemic, but they may be said to be confined to a few counties where social progress has not so definitely advanced as in the greater proportion of the Province. The motto of the Board has not yet been learnt by rote by all the people : "*Ne pereat populus scientia absente.*"

3. SCARLATINA AND MEASLES. These diseases have not shown any tendency to take on a virulence of type which would make them to become causes of severe mortality. A preceding table shows how low the mortality from these causes has become. Nevertheless with regard to the former there are enough of deaths to indicate the disease to have been present in instances in epidemic form, and this fact associated with its general mildness may well cause physicians and householders everywhere to heed the teachings of the early masters with regard to inflammatory changes in organs. Their terms exist to-day and Albutt still uses the terms *scarlatina simplex, septic and toxic*. In a record of 4,015 cases treated in a London, England, hospital, simple albuminuria occurred in 4.25 and acute Bright's disease in 3.4 per cent. of the cases ; and regarding albuminuria, Albutt says : "I hold strongly to the belief that although changes in the renal tissue are by no means necessarily present in an ordinary attack of scarlatina, yet simple albuminuria of any degree and acute nephritis when they supervene are due essentially to the same morbid process, varying simply in intensity, or in the vulnerability of the kidney in the particu

lar subject. The assumption that a simple albuminuria and a nephritis are both the expression of the same morbid action varying mainly if not entirely in respect of degree is supported by certain facts of their development."

They both show a tendency to develop at the same stage of the illness or during the second and third weeks." Apart from the fact that the desquamative process in any but the mildest cases is not over before the fourth and fifth weeks, or later, it is apparent that medical health officers are doing no less than their duty to insist on careful isolation in the bed chamber of even mild cases, so that, especially amongst the poorer classes, this danger of a melancholy ending of the disease may be limited.

4. TYPHOID FEVER AND ITS DISTRIBUTION. It has been remarked in previous years that fevers, notably those of the enteric class, in which the Registrar-General includes all deaths returned as malaria, have shown a notable decline in the last ten years. The following table shows their distributions by classes of municipality, and by months.

*Deaths from Typhoid Fever in Ontario in 1899, from Monthly report of Registrar General.*

Months.	Cities.		Towns and Villages.		Townships.	
	Number of cities having deaths.	Deaths.	Number of towns with deaths.	Deaths.	No. of townships with deaths.	Deaths.
January .....			6	8	14	14
February .....	2	3	5	6	6	6
March .....	4	3		0	7	7
April .....	3	5		0	7	7
May .....	4	7	4	4	8	8
June .....	1	2	1	1	5	5
July .....	2	3	3	3	6	6
August .....	8	21	11	16	14	14
September .....	4	18	17	19	17	17
October .....	7	25	23	31	21	21
November .....	4	10	3	3	18	18
December .....	6	7	10	11	13	13
Total .....		104		104		125

The following is the distribution of the population by the municipal census of 1898 :

Cities.....		440,889
Towns and Villages .....	Towns { 314,820 }	452,567
Townships .....	Villages { 137,747 }	440,889

Apart from the tables illustrating a remarkable immunity from deaths from this disease the distribution is of some interest as serving to illustrate how, relatively, cases exist to a seemingly greater extent in rural places and villages in winter than in summer. Of the cities Brantford alone indicates a notable prevalence of the disease, which is explained in the annual report by the fact of the two wards where wells are still in use largely, having been flooded by the Grand river in spring time, and filth was carried into wells and cellars.

The total deaths in individual cities is given in the following table :

*Deaths in cities from Typhoid.*

Brantford .....	17	Ottawa .....	22
Belleville .....	3	Stratford .....	2
Chatham .....	1	St. Thomas .....	2
Guelph .....	1	St. Catharines .....	3
Hamilton .....	12	Toronto .....	35
Kingston .....	4	Windsor .....	4
London .....	5		

5. THE ABATEMENT OF NUISANCES.—From activity in this work almost more than in dealing with outbreaks of contagious disease have we become accustomed to gauge the sanitary progress in municipal organization of municipalities. Discrimination in com-

parisons must be made between cities, towns and villages; and nowhere can it be better illustrated than by reading the annual reports of the Local Boards of Health and their officers in Part II.

Thus the medical officer of Brantford points out that the typhoid prevailed when the wells were low in August, where filth was distributed by spring floods in the low wards of the cities. Of the 148 cases reported, 30 were users of "city water," and in almost every one of these cases local causes were sufficient to produce the disease; as, for example, 8 cases occurred where defective and foul cisterns ventilated themselves into cellars; three others occurred where the sink discharged into the cellar." It has also been found, from a series of tests of well water taken in various parts of the city, that it was almost universally contaminated with organic matter and sewage, thus the probable cause of disease."

The adoption of a system of town removal of refuse is one of the later stages of the evolution of sanitary work in the cities. Windsor has this year among the smaller cities adopted the contract system; but St. Thomas has made no advance, except to allow the scavenger to collect at a rate paid by the city and at his own risk as regards payment. The city of Ottawa report states that the city has no proper system of garbage disposal, and urges the need of an incinerator for the purpose. St. Catharines similarly has not developed yet any systematic means for garbage disposal, while Belleville has the common system of allowing certain persons to act as scavengers, charging householders a fixed rate, collected at their own risk.

With regard to this class of work in rural municipalities, there, too, we find most notable variations, marked from systematic work in a few to almost total neglect in others. The three matters upon which their energies are most exercised are cheese factories and creameries, and their associated piggeries, there being 1,180 of these factories in existence in the Province, which with their increase have stimulated equally the hog-raising industry. The annual reports of the Creamery and Cheese Factory Associations, containing detailed accounts of the sanitary defects found by their inspectors in and surrounding factories, tell the story of how the rural health boards fail almost completely in dealing with local nuisances caused by such factories and piggeries.

The correspondence of the Provincial Board likewise to some extent reveals the same difficulties, and when it is remembered how delicate are the biological factors governing the production of well flavored, wholesome butter and cheese, it will be seen that an industry with a production in 1899 worth some \$20,000,000 may become the means of great advancement or injury to the sanitary as well as commercial interests of any community.

## CHAPTER II.

### VENTILATION AND HEATING OF PUBLIC BUILDINGS.

It is safe to say that while there has been progress in the work of constructing buildings and in the mechanical appliances for heating them, and even ventilating them, in many individual instances during the past fifteen years; yet there is probably no branch of public health work which has shown so little progress in the systematic development in Ontario as this of those methods of heating and ventilation, which even in the most general way, have official sanction and are governed by either legislative or municipal regulations. If one were to seek for an explanation of this it would probably be found, first, in the very nature of the problem. It must be remembered that the moment life in buildings with closed sides began in climates requiring artificial heat, it became artificial. "The wind bloweth where it listeth" are the words of the Teacher, applicable to the free movements of the outer atmosphere only, and all attempts to confine air and heat necessarily cause a departure from nature's methods and convert the problem of supplying its dwellers in houses with fresh air into a question subject to the limitations of a *secundam artem*. A second reason is that for the very nature of the complex life of any population living in populous centres, there are not in Ontario as yet any regulations fixing in any

definite way the size, mode of construction or number of inmates of houses, except where it is stated under the Factory Act that—

Section 15.—(2) "A factory shall not be so overcrowded while work is carried on therein as to be injurious to the health of the persons employed therein.

"(3) Every factory shall be ventilated in such a manner as to render harmless, so far as is reasonably practicable, all the gases, vapors, dust or other impurities generated in the course of the manufacturing process or handicraft carried on therein, that may be injurious to health."

As the Act states, however, these necessary and reasonable provisions shall not apply where persons are employed at home, that is to say, to a private house or a room or place which, though used as a dwelling, might by reason of the work carried on there, be a factory within the meaning of the Act, and in which the only persons employed are members of the same family dwelling there.

It is further provided in the school regulations, Reg. 6, that public school rooms shall have an air space of not less than 250 cubic feet per pupil, with a superficial area of about 12 square feet, a uniform temp. of 67° F., and provision for a change of air three times every hour.

And a third reason is the lack of well-defined methods of ventilating public buildings, readily applicable to different buildings, arranged so as to secure at a moderate expense an adequate supply of fresh air in such a manner as to be free from draughts.

It will thus be seen that the problem of maintaining house air in a condition of purity necessary to make it in some degree comparable to that of the outside air is in practice a difficult one, judging from results; but nevertheless, when it is remembered that an adult man requires 3,000 cubic feet of fresh air per hour, introduced into his living room in order that such air may be maintained at a point where the carbonic acid produced by combustion in the lungs shall not exceed six parts in 10,000 of air, it is apparent that the evils due to lack of ventilation in private dwellings, public buildings and factories, are one of the most serious sanitary questions existing in our communities. The adoption of some artificial or mechanical means for the purpose of introducing fresh air into dwellings is commonly termed "ventilation," and depends upon some method whereby the air of a room may be removed and replaced by outside air, which, owing to its constant movements, always maintains practically the same constitution. This is understood when it is remembered that air moving at the rate of five miles an hour, or that of the gentlest breeze, will renew the air over a foot square 26,400 times. In warm weather ventilation is easily possible by doors and windows, but in cold weather air must be introduced into rooms, through ducts, having been previously warmed by a furnace.

From the standpoint of the public, there is no doubt that apart from a lack of knowledge of the directly injurious effects upon health of residence in badly ventilated houses, and of the existence of practical means of remedying the evil, the prime difficulty is that the individual recognizes by the eye no difference between indoor and outdoor air. He can recognize closeness, coming into a foul air from outer fresh air, but this closeness is looked upon as inevitable, and the deadened sense of smell soon fails to recognize the foul odors. Moreover, the methods of heating and constructing houses vary so greatly that badly distributed warmth in houses makes people more anxious to confine the heat produced than to introduce fresh air.

Amid the questions of economy to the householder, of the architects who are specially sought out because of their ability to give a fashionable outside to houses, of competition amongst the innumerable manufacturers of furnaces, boilers, grates and stoves, all of which are *said* to be modelled upon the latest scientific principles, it may be well to recall some of the laws underlying what seems so simple, and yet proves to be one of the most difficult practical problems which sanitarians, architects and engineers are called upon to deal with.

To maintain the human body in a state of health, it must not only be supplied with an amount of food requisite for supplying it with energy for work, but it must also consume an amount equal to the task of maintaining the body at a temperature of 98.2° F. As bodies lose their heat both by radiation and conduction, it is plain that non-conducting clothing plays an important part in preventing an undue loss of body heat; but common experience tells us that for persons employed at sedentary occupations in doors, an air temperature of from 60° to 70° F., is necessary to comfort and health. Further

experience tells us that the air of the room must not be in too rapid movement, probably not more than a half-foot per second, and must further, as nearly as possible be as warm near the floor as at 6 feet above it. With the atmosphere in temperate climates ranging in winter between  $30^{\circ}$  F. and  $-20^{\circ}$  F., it is plain that the amount of heat required to keep the air of a house warm, will depend (a) upon the construction of the dwelling; (b) upon the number of renewals of air per hour, and (c) upon the character of the heating apparatus employed. As regard the construction of a house, it is necessary that the walls be made of materials which are poor conductors of heat, that they may be so built that moisture will not readily get into the interstices of the materials, as with soft brick, unpainted boards, and damp foundations; and that they will be so well built of close materials that air-currents will not blow through them. How essential that building materials be poor conductors may be learnt from the notably different conductivities of different substances for heat. Thus, a wall of wood of equal thickness would be three times better as a non-conductor, than one of brick. It is of equal importance to remember that air confined in a close space is ten times as good a non-conductor as wood, hence the important part played by double windows, glass being ten times better as a conductor than wood.

As regards the required changes in the air of the room, it is plain that as this will depend on its size and the number of its inmates, the amount of air to be heated will be simply that required to supply the ideal 3,000 cubic feet per hour to each adult inmate; while the heating apparatus to be chosen will be that which most readily transfers its heat with the smallest loss to the air supplied to the dwelling. While it may be said that, in theoretically discussing ventilation, we need not regard by what method the air to be supplied to a room is heated, yet in practice, the question is a most important part of any system. When carbon or its compounds whether as coal gas or wood is consumed, it produces heat by the union of carbon with oxygen, while hydrogen at the higher temperatures if present, unites with oxygen to form water vapor. In combustion every pound of carbon forms 3.7 lbs. of carbonic acid, and emits heat enough to raise the temperature of 87 lbs. of water from  $62^{\circ}$  to  $212^{\circ}$  F. and every pound of hydrogen produces 9 lbs. of water, and emits enough heat to raise 417 lbs. of water from  $62^{\circ}$  to  $212^{\circ}$  F. For the purpose of estimating the value of any fuel, it is most convenient to estimate the number of pounds of water which can be raised by any given weight of fuel, though  $1^{\circ}$  F. or from  $32^{\circ}$  to  $33^{\circ}$  F. which is termed a *heat or thermal unit*, and which is roughly applicable for every degree from  $32^{\circ}$  to  $212^{\circ}$  F. Experiment has shown that 1 lb. of carbon produces 13,000 units of heat and 1 lb. of hydrogen produces 62,500 units. What then is apparent is that economy in heating means that the largest possible number of units of this heat, instead of being allowed to escape by the chimney, or other way, be transmitted directly or indirectly to the air of the rooms occupied; the air being in such a condition of purity and freedom from movements, and having such evenness of distribution, that a sense of comfort be given to all the inmates.

The modes by which heat is transmitted to the air of a room, viz., by conduction, convection and radiation, all play their part, each being given a greater or less importance according as grates, stoves, furnaces, hot water or steam pipes be the method of heating adopted.

The following results, obtained by Profs. Carnelly and Haldane, of Dundee, Scotland, have much interest in this connection; but they are necessarily to be accepted not so much as indicating the value of any particular system as the mode of application of any of the systems accidentally adopted in those particular schools at that time.

Of 323 schools reported upon 150 were personally visited by Carnelly. The great differences were found in the amount of fuel used per pupil. One large school with hot air furnace, used but 34 lbs. of coal per head in a season, while another used 417 lbs. One with an open fire used but 23 lbs., while another used 239 lbs. In a school for 1,000 scholars the cost in England averaged for installing the system £200 for grates and £500 for low pressure steam. The installation of a mechanical fan ventilating plant with heating cost in a building properly designed for it £850, and put in an old building not specially designed cost £1,000. The results of experiments showed that mechanical ventilation as by fans was much the most effective in maintaining the requisite purity and temperature of the air; was more independent of winds and changing weather; and reduced draughts to a minimum, but has a greater first cost and somewhat

greater cost for maintenance ; but in a town with several schools one janitor could supervise the apparatus in all.

A more recent and perhaps more representative series of methods of heating and ventilation are those found in the Reports prepared under the supervision of the Chief of the District Police of Massachusetts who has special charge of the work of boiler inspection, fire-escapes and the heating and ventilating of public buildings, factories and workshops of the State. The several reports of this Bureau are of extreme interest, illustrating year by year an advance in the scientific supervision of public buildings. The report for 1896, referring to the ventilation of schools, says, "The practicability of ventilating schools admits of no doubt. It is as much a matter of exact knowledge as any problem in engineering or mathematics. It can be done by the aid of power, and may be accomplished by heated shafts or by fans ; all dependence on natural ventilation should be abandoned. The system of mechanical ventilation can be relied upon with certainty. By mechanical means a steady inflow of pure air under all conditions and atmospheric changes can be secured. The extra expense for the power to move air should be recognized and met without question."

"When so many are enquiring how best to secure good ventilation in school and other public buildings, the correct methods gained by years of experience should be made known. In this matter of ventilation there are comparatively few who have made it a specialty and have felt it necessary to perfect their knowledge. The time has been reached when the importance of ventilation is generally appreciated, and there seems to be a willingness to do something for the health and comfort of the pupils in our public schools, and it would be a misfortune not to achieve some real progress."

"Good ventilation consists in the proper arrangement and distribution of the ducts of the incoming and the outgoing of the air, and their relation and correspondence with each other so that the perfect removal of the foul air and the thorough diffusion of the fresh air will be secured. How to supply the occupants of school-rooms or crowded apartments with the proper quantity and quality of air has not always received the attention its merits demand. Something, however, during the past few years has been done towards an intelligent solution of the problem. To know how much air is needed for a given number of pupils in a school-room and to supply it by exact mechanical measurement is now no secret."

"In former reports I have explained some of the methods advocated and in operation in school buildings in the State. One of the methods or systems concerns itself only with supplying air, leaving it to make its way out through ducts provided for that purpose. This is done by means of fans or blowers forcing the air into the room. It is the plenum method. Another system or method advocated is directed to the extraction of the foul air by natural laws, requiring no mechanical means, depending upon the difference between the external and internal temperature, in other words, the tendency of warm air to rise."

"In our experience of the past eight years we have found that the interior temperature of foul-air ducts is practically the same as that of the room. The changes in the temperature are so frequent and the velocity of the wind so various, that, *unless additional heat is supplied to the duct*, the power of the duct or shaft to draw air from the room will fail in many instances to cause upward motion enough to be measured by the anemometer."

"The ways of adapting the means to the end in furnishing to and removing air from crowded rooms are not questions of experiment. The size of ducts, shafts, etc., their location in the rooms and their distribution are not at the present time severe problems. The questions, "Shall the air be taken in at the floor or at the ceilings?" or "Will an upward or a downward movement in the air work to the best advantage?" have been settled upon principles which are available for the practical solution of the problem of ventilation."

"For the effective working of any system of ventilation, it is imperatively required that proper provisions should be made to promote air currents in the right direction, and first in the *fresh air inlet*,—the supply of fresh, pure air from pure external sources. The size of this fresh-air inlet is of great importance. In many instances when provided in our public buildings it has been found to be too small. The warming of the incoming fresh air should be considered at this point. Varieties of heating appliances are in use

for the purpose of warming the air, two of which I will mention,—the hot-air furnace and the high-pressure or low-pressure steam apparatus."

The difficulties to be overcome by the adoption of any system depend upon the operation of the same principles. Heating by convection is due primarily to the movement of air upward, heated and by expansion made lighter, and falling again as it is cooled by walls and windows. By these currents of warmed air coming in contact with our bodies, we are prevented from cooling with undue rapidity in the same manner as by conduction the air of the room is cooled by the cold outer walls and windows. It will thus be apparent that with outer currents of air, as winds blowing against a building, the porosity or openness of the walls and the conductivity of the building materials and the doubling of the windows, must all play important parts in the ventilation and heating of dwellings. To minimize the variations of temperature caused by these several influences in different rooms and at different parts of the same room, to maintain the air at a temperature of  $60^{\circ}$  to  $70^{\circ}$  F., to secure a humidity of the air approaching 70 per cent. of saturation, and to keep the carbonic acid in the room at a point below six parts in 10,000, or to secure from thirty to fifty cubic feet of fresh air per minute for each inmate according to age, and to do this economically is *the problem of ventilation*.

This must be secured too in such a manner that the velocity at the inlet shall not exceed six feet per second, to be reduced to half a foot per second when coming in contact with inmates to prevent the sensation of draughts, although experiment has taught us that a velocity of two to three feet per second of air at an ordinary temperature may be endured without a sense of notable discomfort. How much this last point means will be understood, when it is remembered that a room containing 500 cubic feet of air having an inlet of twelve inches square, if supplying 3,000 cubic feet per hour, would have a velocity of .83 feet per second while supplying only enough air for one adult person. It is thus apparent that in order to maintain the requisite purity of house-air without an excessive air movement, a minimum air space fixed by some at 750 cubic feet per capita is necessary, thereby permitting some four changes of air per hour.

Apart from the question of heating and propelling the air into a room, it is equally clear that the size of fresh air inlets and outlets is of primary importance in the question of the movement of air. An illustration will make this evident. Assuming that properly warmed air can safely move at a rate of two feet per second without discomfort, and that the fresh-inlet occupied a-quarter of one wall of a square room thirty feet wide, it will have renewed the air in the room within two minutes, or thirty times in an hour. As this air is distributed over a space in the room in columns, four times the volume of that opposite the inlet, the general velocity in the room would be but one-quarter that at the opening, or six inches per second. If further the rate of renewal be lessened, it is apparent that the size of the inlet can still be notably reduced if the distribution of the air at the point of entry to the room is assisted by the shape of the inlet. Many of these elements which enter into the problem have been estimated, and even given their place in tables; but it is well that the various elements of the problem be recognized. This may be done by a single example.

A school house of four rooms, each to have a cubic-air space of 240 cubic feet (or  $4 \times 4 \times 15$ ) per pupil for a school of 200 pupils is to be heated and ventilated.

The construction of the building having been made upon the principles of building already indicated, we have to supply means of ventilation for supplying 2,000 cubic feet of fresh air per pupil per hour, or 100 000 cubic feet per hour must be poured into each room with cubic capacity of 12,000 feet. This means  $8\frac{1}{2}$  changes of air per hour, or a renewal of air every  $7\frac{1}{2}$  minutes. An inlet of 2 ft. x 2 ft. would deliver the requisite volume of air if moving at the rate of 6.94 feet per second. With the ordinary smooth ducts, as when lined with tin, to prevent friction as far as possible, it is estimated that from 20 to 25 per cent. is lost by friction, so that in the present instance the duct delivering air in the amount stated at the rate indicated should be about 2 ft. x 2.5 ft. in area. It is apparent that the forward movement of this volume of air will depend not only upon a steady motive power, a *vis a tergo*, by which, as with a fan, a regular pressure is maintained in the duct, thereby creating a plenum in the room, but also upon there being a free exit duct to conduct the air from the room, which removal of air can indeed be accelerated by an exhaust fan at the outlet of the duct or by a coil of steam pipes in the exit shaft by which the air is heated and thereby made to ascend. Much experience

in ventilating shafts by the officers of the Massachusetts Bureau leads to the conclusion that, "as a rule, a reduction of one-fifth the area of the foul air outlets for the size of the fresh-air inlets has proved sufficient for inflowing fresh air. I have seen no reason to change this statement, and it will be found that ventilating engineers and architects who have been the most successful in obtaining good ventilation have varied but little, if any, from the above rules." It is apparent that with the size of the inlets being determined as being, say 80, the outlet would be presented by 100. Along with the various elements as regards the size of inlets and outlets, it is important to have determined by experiment the most successful points at which inlets and outlets should be placed in any room, in order to promote the even distribution of the air introduced. Both English and American authorities are now agreed that in rooms of the ordinary size, as those in schools, inlets should be arranged on the inner walls, at a point from 6 to 8 feet above the floor, while the outlet should be at the floor in the same wall, and in close proximity to the outlet. This arrangement is based upon the fact that the incoming air is usually warmer than that of the room and therefore tends to ascend, and with the forward movement the impulse along with the higher temperature will distribute the fresh air to the farther side of the room; it being further aided by the lessened pressure caused by the downward movement of the chilled air along the outer wall, and the outward movement of this air along the floor to the outlet.

Summing up these points Mr. R. R. Wade of Boston, Chief of the Police Inspection Commissioners, says:

"Whatever differences of opinion may exist as to the merits of the various appliances that have been applied for the ventilation of schools or other public buildings, it must be admitted that the system that can furnish and remove under perfect control a sufficient amount of air, with a velocity that can be regulated and so distributed as to supply fresh air and remove foul air from each room with regularity and perfect independence of weather, summer and winter alike, should be the system to be adopted, and in all appliances that is the simplest which most positively and directly effects the purpose in view."

The problem of heating the air equally has in every system proved of much difficulty in practice when a definite amount of fresh air is to be delivered. In estimating the work to be done, it is apparent that an average external temperature must be taken as the basis of ordinary work, and that for extremes a system of extra coils must be supplied either in the rooms or in the cold air chambers in the basement. A four-horse power gas engine has been proved sufficient to give to a 4 ft. diameter fan enough revolutions to supply 1,000 persons (pupils) with 2,000 cubic feet per head per hour; hence with any system of steam heating, boilers of sufficient power can be economically used, even where electricity is obtainable for supplying power to the fan.

In the problem here we may assume that the outer air to a temperature as low as 15° F. is to be heated in the basement cold-air chamber, to be delivered in the room at 70° F., and that for colder weather steam coils be placed in the rooms for subsidiary heating.

In practice it may be said that the same number of heat units is required to raise water through any degree of temperature from 32° and 212° F., and proportionately air through any degree from 15° to 70° F., the ratio between air and water being at 212° F. as 1 to 1000. Now the weight of a cubic foot of dry air at 32° F. and 30 inches of barometric pressure is 566.9 grains, or 1000 cubic feet equal 81 lbs. Assuming that a cubic foot of water at 212° F. weighs 60 lbs., it will hold 10,800 units of heat. Hence it would raise 3272 cubic feet of air through 55° F. It has been estimated that the combustion of 1 lb. of coal will produce 14,000 heat units, and if the combustion in an ordinary furnace amounts in loss to 3200 units, or more than one-fifth, we find that 1 lb. of coal will raise 1 cubic foot of water from 32° to 212° F., or will heat 3272 cubic feet of air. Or, roughly, 4 lbs. of coal will be sufficient to heat the 12,000 feet of air required to change the air of a room, 32 ft. x 25 x 15, in  $7\frac{1}{2}$  minutes. It is apparent that the amount required will be the same, whether the method of heating be by hot water, steam or hot-air furnace, provided the combustion be equally good in all and the loss of heat the same, if the mechanism provided supplies the heat to the fresh air all at the same rate.

Taking warm weather with cold weather throughout the winter season in Ontario, this calculation would mean that, for a school-building of 4 rooms of the above size and



holding 200 pupils, from 25 to 30 tons of coal would supply an adequate amount of heat.

The illustration of principles thus given in some detail enables us in some degree to estimate the various factors entering into the problem of ventilation. Many simple methods are adopted for lessening the evils of over-crowding and air foulness in small buildings, but the scientific problem having had its practical solution in a large measure determined, it now requires some specific measures for its systematic application to schools and public buildings. As an illustration of modern systems in practical operation the following points are taken from the last report of the Massachusetts Bureau, or that for 1898.

The report states the plans are in substantial accord with the recommendations of the Bureau. One is of a building two storeys high, with eight school-rooms, each 28 x 32 by 12 in height, all constructed of brick. The heating is supplied by two steel tubular boilers of about 30 horse-power each. There is also a small boiler for heating the vent flues in mild weather. The radiation is nearly all indirect, massed in two large chambers in the basement, four rooms being heated from each chamber. There are direct radiators in the play-rooms, in the basement, and in the corridors and principal's room; also in the lower hall and in each vent flue. There are 360 to 380 square feet of radiating surface in the steam coils for each room, so arranged that one-third, two-thirds or the whole may be used. Provision is made for drawing the air of school rooms into the cold-air rooms, when the building is unoccupied, for conservation of heat. The buildings have, in addition to play-rooms, wash-rooms and water-closets. Mixing dampers in the fresh-air inlets are regulated by thermostats in the different rooms. Ventilation is aided by steam coils in exit shafts. Another building has an amount of indirect heating of the cold-air rooms by steam coils adequate for heating the air with external temperature as low as 15° F., while supplementary heating by direct radiation in the rooms is supplied. A fan for forcing in warm air is utilized. It is apparent that with whatever system we may adopt there are many details in its practical operation which demand intelligent supervision if successful results are to be obtained. The questions of friction and the size of fresh-air ventilating shafts, the velocity of cross-currents of air at the entrance of the shaft for fresh air from the exterior, the variations in barometric pressure and in external air temperature, all demand an intelligent comprehension of such causes and their effects and of the means in the mechanism of ventilation of making compensation for such variations. From the standpoint of legislative enactments to provide for the application of scientific means to secure a standard of ventilation in any public building and for supplying such system of expert officers for inspecting and regulating this work in public buildings in this Province, it would appear evident that at the present time there is no means similar to that for many years in operation in Massachusetts adequate for the work to be done. Local Boards of Health have, under the general provisions of the Public Health Act of inspection, probably enough powers to correct any serious unsanitary condition, but the exact scientific knowledge requiring to be applied to any particular case demands some special scheme to be formulated, so that new buildings in all urban municipalities and all school buildings in rural districts should have their plans approved before construction, with certain proper provisions for ventilation, while definite powers to compel the adoption of adequate measures in old buildings should be put into systematic operation.

### CHAPTER III.

#### THE ECONOMIC VALUE OF SANITATION AS A MEASURE AND MEANS OF SOCIAL PROGRESS.

In the closing chapter, entitled "Dynamics," in his work on "Civilization and Progress," by Dr. John B. Crozier of London, England, are the following words:—

"All thinkers, whether they be Theist or Atheist, Trancendentalist or Materialist Christian or Comptist, feel and agree that there is in man an ideal of expansion and elevation of mind and heart which is not only the end of nature, but is the goal of society, and to forward which the efforts of all the good and wise should be directed."

Again, "It is this ideal which is constantly building up the new civilization, which ever lies more or less concealed under the old, and which when the old has decayed and fallen to pieces, comes forth to take its place."

"This ideal has many sides, but they may be all summed up in the old and well-recognized forms—the love of beauty, the love of right and the love of truth."

Alongside these sentences it may be well to place the words of that man, Sir Humphrey Davy, sprung from the people, and who before he was thirty years of age was teaching all England philosophy, and who was honored with titles by royalty, and worshipped by the people to whom he gave his invention of the safety-lamp, thus saving the life of thousands.

"The scientific glory of a country may be considered, in some measure, as an indication of its innate strength. The exaltation of reason must necessarily be connected with the exaltation of the other noble faculties of the mind; and there is one spirit of enterprise, vigor and conquest, in science, in arts and arms."

We have quoted these several paragraphs as aptly setting forth the truth that he who would rightly understand the forces which in any age have been operative to produce any widespread and permanent influence must comprehend that such are not newly created, but only some new direction given to laws which can never be increased or diminished, just as the law of the persistence of force, causes the phenomena of heat, motion, gravitation, or electricity to appear, force itself never being lost, at the bidding of him who learns nature's processes. Such an one must not alone study religion, or politics, or pure science by itself, but all of them as parts of a whole; since man is of necessity a being influenced through his emotional, intellectual and more material faculties, and is but a single unit in that larger unit of society, which must necessarily become influenced in this same direction before social advancement in any great degree becomes possible.

Nowhere in the history of the past century do we find this more notably illustrated than in the progress of sanitation, a word which is used here in its broadest sense, viz.; "*the science of life saving.*" Take but one illustration, that of the Davy safety-lamp. During the early part of the century the world was repeatedly startled with stories of explosions in coal mines from fire damp. The best minds amongst mine owners and managers had given their energies to the problem of preventing such disasters. Physicians and clergymen in the mining districts, witnesses of the horrors, kept public attention alive to the dangers by pamphlets and letters to journals, not under the thumb of mine owners. On May 12th, 1812, an explosion, the greatest then known, at Gates-head-on-Tyne, killed 92 men and boys, while others less fatal occurred in the next three years. A society finally was formed with bishops and nobility as its prominent members. A report was published and the society received numerous suggestions as to a remedy; finally Davy was appointed to take up the question and within three months of the time he was appealed to, had taken up the question which is one of pure chemistry and physics, and had solved it. Learned societies, owners and managers of mines and the miners' clubs were unanimous in their praises. The Edinburgh Review of the time, said:—"The safety lamp is a present from philosophy to the arts, and to the class of men farthest removed from the influence of science. The discovery is in no degree the effect of accident and chance, which comes in for so large a share in the credit of human inventions, and it has no claims other than on what is altogether the result of patient and learned research."

The moral and intellectual side of this matter is further beautifully illustrated by Sir Humphrey's reply to Mr. Buddle, one of the large mine managers who suggested that he should patent the discovery and make from £5,000 to £10,000 a year. "My good friend I have never thought of such a thing, my sole object was to serve the cause of humanity; and if I have succeeded, I am amply rewarded in the gratifying reflection of having done so."

In these extracts from two writers, one speaking in the opening and the other in the final decade of the century, are clearly set forth the same philosophical truth, viz.:—*That underlying human progress must be the primary knowledge of Nature and a belief in goodness at the heart of things, and that no mere acquaintance with the uses of even scientific inventions in any degree postulates a relative expansion and elevation of mind, which depends upon a consciousness of this ideal in the individual, and of a conscious effort to attain to it as the end of his desires.*

How many of the thousands who ring the telephone bell have the faintest idea the painful steps of a Voltà, an Ampère, a Davy, a Faraday or Bell in their ascent of Panassus, during a whole century, before the simple operation of ordering the dinner by telephone became possible; and how few miners after the first wonder was over, ever

thought of the knowledge of the physical laws required to be known before the simple brass wire mantle of the safety lamp could be thought of !

These preliminary remarks have been made simply for the reason that sanitation being primarily a personal matter, there must, as the condition of sanitary progress, be a breaking down of obstructions *physical, organic and spiritual* in the individuals which constitute any society.

To illustrate : With war as the condition of English society for almost a generation, family bereavements, the maiming and crippling of individuals, the absolute misery and pauperism of the masses had grown to be the normal condition of life for the larger proportion of the people. Social distress had become so extreme that it approached that condition which made the French populace in the days of Robespierre run dancing by the side of the rumbling death-cart, as it carried its daily load of victims to the guillotine; and shouting in their glee "*Il va bien*"—it goes fine ! At the end of the Napoleonic wars, which had kept wheat up to 70s. a quarter, Dives was still true to himself and not content with abnormal gains during all these war years, the agricultural interests had a bill passed in 1816 prohibiting the importation of corn until it reached 80s. per quarter. Misery forced on rioting amongst the masses, hay ricks were burnt, conspiracy after conspiracy for overturning the social fabric and government was formed, ending in the Manchester rising and the Peterloo massacre. But beneath the surface in all this, the new heaven was working. In Agriculture, Mr. Coke, of Halkham, in Norfolk, learnt and practised scientific agriculture till the value of his rentals rose in forty years, from £2,200 to £20,000 largely owing to science applied to agriculture ; and science and the arts were transforming the textile industry. The power loom was in 1815 just coming into use. Cotton production caused from 1815 to 1820, 82,000,000 of imports of raw material to rise to 247,000,000 lbs., with the increase of labor-saving inventions. With all this, the great towns grew rapidly, and population rose from 11,000,000 in 1815 to 16,000,000 in 1838 ; yet with all this, wages advanced but little. The masses were still in misery without internal organization and without protective legislation. Trade combinations were prevented by law, and in 1813, the justices were prevented from fixing the minimum wage. It was apparent that such opposed conditions could not long continue. Rioting and rick-burning suited the oligarchy, but Adam Smith, the philosopher, William Cobbett, the social reformer and editor of the "Weekly Register," the Hampden Club with its workmen orators and poets, and isolated aristocratic adherents as Francis Burdett, Spencerian societies for the nationalization of land, the philosopher Hume's advocacy of the right to organize labor were all at work playing their part in the education of society, leading up finally to Catholic emancipation to the Reform Bill of 1832 and to the Factory Commission of 1832 and Poor Law of 1834.

The justness of the proposition that elevation of the individual mind is not adequate for a permanent social progress is seen in the spasmodic reform in prison discipline in consequence of the self denying labors of John Howard toward the end of the 18th century.

Mr. Arthur Griffiths tells us, in "Traill's Social England," that the prison reforms had in large measure lapsed by the end of the Napoleonic wars. So crowded were the inmates that they had to sleep sideways to find room on the floor for all to sleep ; men and women were huddled together and brutality and abuses of management abounded. The peculiarly humanitarian work of agitating this reform was done largely by the Quakers, who were supported by Burton and Wilberforce in the House. The work was herculean, and was pushed forward by these earnest workers in spite of ridicule, even from some of the clergy. Some enactments were obtained in 1825, and the "Cellular" system was introduced in 1835 and in 1837 Lord John Russell swept away in almost a single act, the death penalty for every crime but murder.

It will have been noted that so far not a word has been said regarding sanitary reform, nor indeed was such *per se* to be expected under such social conditions. Disease is a matter of the individual. If he took sick there was the physician, and if too poor then the dispensary and after that the workhouse. Besides did not Providence send sickness, and have not men to die some time ? Destruction by an explosion in a coal mine should be prevented, but who could prevent disease ? None knew the nature of contagion, although many individuals had observed the spread of disease through overcrowding and the presence of filth.

But the time had come with the various reforms growing out of scientific progress and the diffusion to some extent of a knowledge of natural laws, when this, the last born daughter of Science, including as she does the practical application of all the sciences to the science of life, was to have her birth.

And like all the others, Sanitation had her spokesman. Edwin Chadwick, a London lawyer, with a talent for statistics and a deep interest in social reform, addressed a letter to Sir John Russell, the Home Secretary in 1837, at the time when he, Chadwick, was acting as secretary of the Poor Law Commissioners. He pointed out in this letter that preventable diseases became a direct cause of poverty; and as a result of the report Lord Russell appointed a commission of enquiry in 1839, viz.: "As to the extent to which causes of disease prevail amongst the laboring classes in the metropolis; also amongst the laboring classes in other parts of the United Kingdom." This was the year succeeding the passage of the Act relating to the Registration of births, marriages and deaths, and it was the returns of that year which showed that deaths from the preventable diseases, as typhus, smallpox, etc., were 56,461 in a total of 338,979 or 10.6 per cent. of the whole. In 1897 this class in England constituted only 7 per cent. of the whole, and 1839 was a good year compared with the epidemic years of typhus and relapsing fever from 1816 to 1820, with typhus and typhoid again from 1826-30; while from 1830 to 1838 it was epidemic upon epidemic of cholera, smallpox, typhus and Russian influenza. To understand the saving in deaths alone from zymotic diseases it may be said that the population of England and Wales is to-day just double that in 1838, and that the deaths from this class of disease were in 1897 33,595, while had the 1838 rate prevailed in 1897 there would have been 113,000, or the rate has been reduced by more than two-thirds during the period.

Or, as Chadwick put it, with regards a single disease, typhus, "That if 1 in 10 sick persons died of the disease in 1838, as was the actual case in the metropolis, then a quarter of million of people in England and Wales suffered in financial loss and sickness from the disease, or the total deaths in England in a single year from typhus were double the loss suffered by the combined armies at Waterloo.

Loss of this character may further be illustrated by the deaths from consumption, which even more accurately measures the social surroundings of individuals as regards housing, wages and general elevation in the standard of living. The sanitary progress in the last 40 years seen in the decreasing death rate by decades has been from 1861 to 70 an average death of males of 2,467 reduced to 1,598, of females 2,483 to 1,259 per million persons; or 83,700 persons' lives have been annually saved to the state in England, or 90,240 in 1897, over what there would have been had the rate from the early period prevailed. Or the reduction was 44 per cent.

We may refer to a few facts as set forth at length in the Report of 1839 on the Sanitary Condition of the Laboring Classes of Great Britain, drawn up by the commissioners, George Nicholls, Sir George Cornwall Lewis and Edmund Walter Head, Mr. Chadwick being secretary, appointed by Lord John Russell. Street-cleaning and paving in it are recommended, illustration being given of then existing conditions. One section reads: "The civic officers have generally contented themselves with the most barbarous expedients, sitting still amidst the pollution with the resignation of Turkish fatalists, under the supposed destiny of the prevailing ignorance sloth and filth." Construction of sewers and introduction of water supplies was next dealt with. Land drainage was illustrated by the good health due to the draining of the Ely fens. In another section of the report Chadwick deals with the subject of ventilation, one which even to-day demands from us an attention not given to it in any degree adequate to its importance.

In the report it is remarked that the frequency of early deaths and orphanage amongst journeymen tailors led to special enquiries and observations made as to the effects of bad ventilation (a) on the moral habits, (b) loss of healthful existence to the employee, (c) loss of profit to employer and employee through sickness, (d) loss in expenditures for relief under the Poor Law. Most of them died from consumption. By their own rules a man at 50 was superannuated and was thought not fit for a whole day's work. Their average expectancy of life was about 32. No provision was made for their families, and these usually went on the parish.

In statements published is one by a journeyman tailor that the life of a London tailor, who worked in such shops as were described in the report, was shortened over that

of one in a country village or town by ten years, and that the conditions under which he worked caused a loss of one hour's work daily, the two losses together amounting to a total loss of 50,000 hours, which at 6d. meant a total productive loss of £1,250. Such effects of over heated and non-ventilated rooms did not then and do not now limit themselves to any single trade. He gives another example where in four years from 1784, 2,944 children out of 7,650 died at a lying-in hospital in Dublin, but the rate was reduced by proper ventilation to 229. In the Glasgow "Barracks Building" there were 500 people, there being one family to each room, where typhus was never absent, one case dying in every seven; but after a two-inch tube was placed in the ceiling of each room leading directly to the chimney, fever practically disappeared during the next eight years. Statistics showed that in 1840 one child in every 180 and one widow for every 500 of the whole population were in the union work-houses.

Such were the valuable materials embodied in reports and pamphlets for the next ten years by Mr. Chadwick, but not till the typhus of 1847 was succeeded by cholera in 1849 did official sanitation advance to the stage of a regularly appointed health officer for London, when Dr. John Simon presented his first annual report dealing especially with street filth, sewerage and filth diseases, water supply, the social condition of the poor, unsanitary dwellings and offensive trades. What some of these conditions must have been may be judged when Dr. Simon in 1854 dared to say in his City of London Report, "If there be citizens so destitute that they can afford to live only where they must straightway die—renting the twentieth straw-heap in some lightless fever den, or squatting amidst rotten soakage, or breathing from the cesspool and the sewer; so destitute that they can buy no water, that milk and bread must be impoverished to meet their means of purchase, that the drugs sold them for sickness must be rubbish or poison; surely no civilized community dare avert itself from the care of this abject orphanage. If such and such conditions of food or dwelling are absolutely inconsistent with healthy life, what more final test of pauperism can there be, or what clearer right to public succor, than that the subject's pecuniary means fall short of providing him other conditions than those? It may be that competition has screwed down the scale of wages below what will purchase indispensable food and wholesome lodgment. Of these, as fact, I am no judge; but to its meaning if fact, I can speak. All labor below that mark is masked pauperism. Whatever the employer saves is gained at the public expense."

Such reports as this of Dr. Simon were the result of the first health law—"Health of Towns Bill"—passed in 1848, the year of the cholera, the provisions of which were executed by a central board of health till 1855, then by the privy council, and finally since 1872 by the local government board. In this year only was sanitary legislation extended to rural districts, whose general work since 1894 is supervised by district councils.

Such slow growth is wholly in keeping with our postulate, that there must be a general advance in social education in order to make any reform possible and permanent. Illustrative of this is a remarkable sentence by Dr. Simon in his 1854 report: "To the philosopher, perhaps, any partial sanitary legislation—even for a metropolis—may seem of low importance as compared with the corresponding need that the legislation of the country should be imbued with greater sympathies for life. Yet London is almost a nation in itself, and the good which might be effected by its sanitary regeneration would, even as example, be of universal influence." There were millions of people in the rapidly advancing industries of England who were intimately informed on the influences affecting the rise and fall of wages, and had organized trade unions, co operative associations, and the influence of such assisted by such philanthropists as Lord Shaftesbury got Factory Act after Factory Act passed and amongst these that most valuable of all from the sanitary standpoint "The Alkalies Act," with its chief inspector Dr. Angus Smith, an eminent chemist, and its local inspectors.

But such broadening of the horizon of the public mind was accentuated by the reappearance of epidemics both of cholera and typhus in 1865-66. It was in 1865 that the Government ordered certain scientific researches to be begun. Dr. Thudicum, a chemist, was then first employed to study the chemical processes of disease, and from that year onward Annual Reports gave the results of studies upon the diseases of man and animals, such as that carried out by Prof. Grainger regarding the rinderpest in 1867. First in 1865, inspectors of the Government Board investigated epidemics as of typhus at Greenock, puerperal fever at Maidenhead, diphtheria at Great Ormesby, scarlatina at Welling-

ton, typhoid at Hadlow, cholera at Southampton, and yellow fever at Swansea. In the same year medical officers were sent to study foreign epidemics, as the plague in Russia and cerebro-spinal meningitis in Germany. It is in the Report of this year that we find the question of contagion discussed in terms closely approaching those of to-day, Dr. Simon uses the words: "And more and more the once chaotic phenomenology of contagion is tending to become an intelligible and consistent section of the great science of organic chemistry." Indeed, it is in these very years that Pasteur is carrying out the earlier of his remarkable investigations, as into the origin of charbon and the silk worm disease, which settled for all time the doctrine of a "contagium vivum" on an en during basis. But how closely clinical facts had already been associated with sanitary observation may be seen from the words of Dr. Simon: "On the other hand, not even the merest tyro in medicine supposes that contagion (as a morbid power acting from each sick centre) operates equally on all persons, or equally under all varying circumstances of place and time." He then refers to (a) personal differences of susceptibility, (b) the local surroundings of contagiously-diseased persons, and the power of contagion to show an almost infinite range of differences, (c) and that in different lands and different ages of the world in category of time, far out of human reach, there are circumstances which greatly influence contagion."

How progress in the belief as to the natural history of diseases has gone on and how executive measures for their suppression have advanced concurrently therewith is gathered from an extract from Dr. Simon's report for 1868. He says: "It is the almost completely expressed intention of our land that all such states of property and all such modes of personal action or inaction as may be of danger to the public health should be brought within scope of summary procedure and prevention." Large powers have been given to local authorities, and obligation expressed or imposed on them, as regards their respective districts, to suppress all kinds of nuisance and to provide all such works and establishments as the public health primarily demands. And in the interests of health the state has not only, as above, limited the freedom of persons and property in "certain common respects; it has also interfered in many special relations"; and he further points out how it had interfered between parent and child, as in vaccination and limitation of hours of industrial labor; between employer and employed with regard to the sanitary condition of factories; between vendor and purchaser in the matter of adulterated foods and drugs and unwholesome food products; and the prevention of epidemic disease at public expense, and in the larger control of municipal works like sewage disposal to prevent danger to public water supplies.

It is in the report of 1869 that Dr. Simon refers to the published work of Dr. Burden Sanderson, and states: "It will now be seen that the views indicated in Dr. Sanderson's report with regard to the agencies of morbid infection are the views of Prof. Schroder and M. Pasteur on the agencies of fermentation and putrefaction. In 1870 Dr. Simon states: "I am glad to state on the evidence of this report (Dr. Sanderson's) that, even at the present very early stage of work, Dr. Sanderson's investigation is giving results which are of direct interest to the practice of medicine and surgery." Within six years thereafter Prof. Lister had immortalized himself by applying the principles of asepticism to the treatment of wounds and had revolutionized surgery.

In the report of 1870 Dr. Simon deals at length with the constitution of local health committees and says what in 1900 bears upon public health work both in England, in Canada and in the United States: "In the first place there is the largeness of the continuing waste of human life. It seems certain that the deaths which occur in this country are fully a third more numerous than if our existing knowledge of the chief causes of disease were reasonably well applied throughout the country; that of deaths which in this sense may be called preventable, the average yearly number in England and Wales is now about 120,000; and that of the 120,000 cases of preventable suffering which thus in every year attain their final place in the death register, each unit represents a large or smaller group of other cases in which preventable disease not ending in death, though often of far-reaching ill effects in life, has been suffered. And while these vast quantities of needless annual suffering, if regarded merely as such, would be matter for indignant human protest, it further has to be remembered, as of legislative concern, that the physical strength of a people is an essential and main factor of natural prosperity; that disease, so far as it affects the workers of the population, is direct antagonism to industry; and that

disease which affects the growing and reproductive parts of a population must also in fact be regarded as tending to deterioration of the race."

The quotations made from these reports during the preceding ten years are of extreme interest, as illustrating the formative stage of present legislation, and show how accurate scientific knowledge accumulating from year to year formed a motive force which, as a knowledge of its practical bearing came to be generally diffused, placed public health legislation both in England and Canada almost upon its present basis. It has been already noted that in 1874, sanitary law in England was made applicable to rural districts, and we find that in 1876 all the Public Health laws were consolidated. Since that time public health work in England has moved on almost uneventfully, each year producing its harvest of lives saved. What this actually was is gathered from the statistics which show that between 1872 and 1882 the death rate in England decreased 4.5 per cent, or in other words 250,000 persons were living in 1882, who would have been dead had the deathrate of the previous decade continued. From this latter year, 1882, the operation of sanitary laws has become a matter of ordinary routine and common knowledge to the people of Ontario, for in that year the Provincial Board of Health was appointed by statute; and in 1884 a Public Health Act, applicable to every municipality in Ontario was passed. A reference to this early period is of interest at the end of eighteen years.

In the report of the Board for 1883 may be found the following sentence. "Let us examine the last published report of the Registrar General of Ontario, (1881,) and we will find there that the recorded deaths from diphtheria for the preceding year were 1171; from scarlet fever 470, and from all those diseases which are readily admitted to "spread" from a first case, there was a total of 3000. During the past year the following question has been asked of a number of medical men. "Do you think that one-half of the cases in your neighborhood could have been prevented if you had had a medical health officer and proper by-laws?" The answer has invariably been "Oh, yes, far more than that". But let us content ourselves with assuming that only one-half of these persons might have been prevented from catching the disease by proper precautions and strict watchfulness, and this will give us 1500 persons who might have been saved from death. Consider along with this, how many of the 2397 persons who died in that year from pulmonary consumption, might still be alive if better ventilation had been adopted. Adopting English calculations of the value to the state of lives saved, this report further stated, "At the end of a period of six years from this date the annual saving would be nearly \$4,000,000." That those roseate hopes have been fulfilled, and that lives to the ideal extent have actually been saved may be gathered from the last published report of the Registrar General for 1898. The deaths from contagious disease, as actually recorded, from smallpox, scarlatina, diphtheria, measles, whooping cough and typhoid were 1,527.

It must be remembered further that the population has increased from 236,739 in 1882 to 440,979 in the cities alone.

Such is a *resumé* of the conditions which have marked the progress of the science of public medicine during the century, now closing, and, were it possible to summarize all the causes producing the wonderful results which we have endeavored to indicate, one could not do better than catalogue the vast development of inventions and discoveries and their practical application in the Arts and Sciences. But along with this development has gone an evolution of scientific thought in its application to social and moral problems, which has depended primarily upon the increasing knowledge of and belief in the uniformity of natural laws. The belief has enormously extended in society that a particular effect *must* have its cause by which we mean that the force which it represents *must* have been taken from somewhere else, that is to say, must have its cause elsewhere; and hence the old beliefs in diseases being visitations of Providence, of there being physical or social laws by which the poor are required to remain poor and that the woes of this life are to be endured with the fatalistic stoicism of a Mahomedan, for the sake of the sweets and joys of a future paradise, have largely disappeared. Amongst even the common people the practical knowledge has grown that they need not have smallpox and hence they demand, it may be spasmodically yet, action on the part of the authorities to prevent it. They have heard that antitoxin cures diphtheria and they are prepared to submit their children to inoculation with it, even though with regard to its action they may be as yet, and indeed will continue to be, profoundly ignorant. Dr. Crozier asserts that these demands for pro-

tection against disease, and a willingness of the individual to submit to personal inconvenience are the true measure of the *level* of the stage of men's material and social progress, or reversing the statement "that our moral ideas, our practical beliefs, all grow out of our *material and social surroundings*."

"So great indeed, is the unity and intimacy, the harmony and proportion existing among the various social and moral products of any given epoch, that, accompanying a particular stage of culture, you may confidently predict a corresponding stage of manners, of customs, of morality, of religion."

Marvellous as by comparison have been the stages of progress in "life saving during the century it would be idle to suppose that these notable illustrations of life-saving in the matter of the so-called preventable diseases are the measure of progress in a directions, as for instance those diseases, which depend more or less upon a phase of social life, which, not marked by material poverty, may yet be marked by a poverty of practical knowledge of and belief in the effects of those conditions of an artificial life growing out of that very material progress in the arts which have brought scientific conveniences to increase the comforts of life in the home of every town dweller. On its purely material side it produces the evils of hot-air furnaces, the poisonous products of water-gas, the injurious results of electric light on the eye, the disturbances of digestion and nutrition by the enormous consumption of sugars, especially, the glucoses, and a long line of evils, to which an earlier generation were not exposed. In the mental sphere, the universal privileges of free education, bringing with the ability to read, the power to learn, not only the great political movements, but all the sensational occurrences of society, whether in the commercial, social or criminal world have similarly their degenerating influence. The effects of this class of teaching on the mind of the child soon to become the man, is patent on every hand; and, unfortunately, it is not antidoted by keeping the child's mind imbued through practical science teaching, with those broad laws governing all phenomena, whether physical or mental. The sensationalism thus developed again manifests itself in the moral sphere and a hysteria in the sphere of religion is the logical outcome of previous influences. Thus the diseases of the nervous system, affecting all nutrition, and diseases of the digestive and secretory organs are notably on the increase, while others such as cancer, seeming to be especially associated with these vices of nutrition, are becoming notably more prevalent. It is apparent to one who would study these current influences, that the ascent of Parnassus is difficult for man in any sphere; and during recent years and not in Canada alone, it has been easy to mark the bearing upon public health work of this false æstheticism. Sir John Simon, writing on "Experiment as a basis of Preventive Medicine," years ago used words which can well be repeated: "In certain circles of society, at the present time, æsthetics count for in all . . . with such sections of society our profession cannot seriously argue. Our own verb of life is *ergazesthai* not *aisthanesthai*. We have to think of usefulness to man. And to us, according to our standard of right and wrong, perhaps those lackadaisical æsthetics may seem but a feeble form of sensuality."

Very much might with reason be added to indicate movements inimical to the highest interests of our public health and we have said enough to point out with our causes for rejoicing at the progress of a century in the amelioration of human misery, and of the marvellous increase in the means for making the lives of every class more enjoyable, the existence of parasitic growths, which seem like those in Nature to be peculiarly prone to attach themselves to our most luscious fruits, and to our flowers of the most delicate perfume.

"There is light in all  
And light with more or less of shade in all  
Man-modes of worship."

While recognizing, however, these facts, yet the progress and civilization of a century and the conditions upon which they have depended are so evident that we may say that for the coming century and indeed for all centuries all true civilization and progress must depend upon science by which in the words of one of our modern teachers we



would say, "that knowledge of the laws of the world and of the human mind, which alone can enable us to work in harmony with the Supreme Power, and towards the same great ends."

"A sun but dimly seen  
Here, till the mortal morning mists of earth  
Fade in the moon of heaven, when creed and race  
Shall bear false witness, each of each, no more,  
But find their limits by that larger light,  
And overstep them, moving easily  
Thro' after-ages in the love of Truth,  
The truth of Love."—Akbar's Dream.—Tenn.

Respectfully submitted,

P. H. BRYCE,  
Secretary.

## REPORT OF THE LABORATORY WORK OF THE BOARD FOR 1899.

By J. J. MACKENZIE, B.A., M.B., BACTERIOLOGIST.

The total number of specimens examined in the Laboratory of the Board during the year 1899 was 1,370, which were made up of the following items :—

Suspected sputum .....	629
Suspected exudate .....	375
Suspected typhoid blood .....	164
Waters for bacteriological examination.....	116
Waters for chemical examination .....	29
Miscellaneous samples.....	52
Suspected rabies .....	5
	<hr/>
	1,370

Of these samples, 1,100 were sent in by 300 physicians, as follows : 112 sent 1 specimen each, 59 sent 2 specimens, 30 sent 3 specimens, 26 sent 4 specimens, 12 sent 5 specimens, 12 sent 6 specimens, 10 sent 7 specimens, 7 sent 8 specimens, 6 sent 9 specimens, 8 sent 10 specimens, 4 sent 11 specimens, 2 sent 12 specimens, 2 sent 16 specimens, 1 sent 17 specimens, 1 sent 19 specimens, 2 sent 20 specimens, 1 sent 22 specimens, 1 sent 30 specimens, 1 sent 32 specimens.

These 300 physicians were distributed as follows :

From 1 municipality.....	33 sent specimens
" 1 " .....	7 " "
" 1 " .....	6 " "
" 2 " .....	5 " "
" 4 " .....	4 " "
" 9 " .....	3 " "
" 36 " .....	2 " "
" 129 " .....	1 " "

In addition to these figures, two municipalities sent all diphtheria cases for diagnosis or release from quarantine through the medical health office, in all 84 specimens. Specimens were received from a total number of 196 municipalities.

Unfortunately with the sputum, exudate and blood samples, only a limited number of cards with clinical history was sent in so that the details of these cases cannot all be worked out.

*Tuberculosis.* The cards which are received with the samples of sputum ask for the following data : name, age and sex of patient, name and address of physician, date of first symptoms, present symptoms and history of infection, if any. The age and sex of patient and the duration of symptoms have been given with fair accuracy. The presence or absence of infection has been given in the vast majority of cases, and it is hoped that the error through carelessness will be to a certain extent cancelled in both those which give positive evidence of tuberculosis as a result of microscopic examination and those which gave negative results. The question in regard to present symptoms, it is feared, has not been answered as fully as it should be, but the results have been tabulated in so far as they are given. It is hoped that these data taken with the results of the microscopic examination may in time lead to an increase in our knowledge of the earlier symptoms of tuberculosis.

Altogether 441 cards were received with samples of sputum, 172 of these samples showed the presence of the bacillus of tuberculosis and in 269 it was not found (percentage positive 39.0), eight of the 269 were second or third samples from previous cases, so that they are not included in the tables.

*Arranged according to Age of Patients.*

Age of patient.	5 yrs. and under	6 yrs. to 10 yrs.	11 yrs. to 15 yrs.	16 yrs. to 20 yrs.	21 yrs. to 30 yrs.	31 yrs. to 40 yrs.	41 yrs. to 50 yrs.	51 yrs. to 60 yrs.	over 60 yrs.	No data.
Negative .....	1	4	7	43	81	53	34	23	11	4
Positive .....	0	1	1	23	69	31	25	14	5	3
Percentage positive .....	0	20	12.5	34.6	46.0	36.9	42.3	37.8	31.2	42.8

*Arranged according to Duration of Symptoms when Specimens were sent.*

Symptoms have persisted.	1 month and under.	1 month to 2 mo's.	2 mo's to 3 mo's.	3 mo's to 6 mo's.	6 mo's to 12 mo's.	12 mo's to 2 years.	Over 2 years.	No data.
Negative .....	33	39	23	59	55	16	26	5
Positive .....	8	23	21	46	43	18	9	4
Percentage positive .....	19.5	37.0	42.8	43.8	43.8	52.9	25.7	44.0

The above table is interesting in regard to the number of positive diagnoses made in the first two months of the disease and the large percentage of negative results in those cases which had persisted for more than two years.

In the former class, of course, one must take into account ordinary inaccuracy of a patient's statements when questioned in regard to the period of time that has elapsed since the beginning of a disease, but in quite a number of cases additional information is given which fixes the date with comparative certainty, such, for instance, as an attack of influenza or pneumonia.

In the latter class we undoubtedly have instances of the so-called fibroid phthisis, as other symptoms point to phthisis even when the bacteriological examination is negative.

The answers to the questions concerning the symptoms at the moment of sending the sputum, have been carefully gone over and have been tabulated according to the actual data given. That is, if pyrexia is not mentioned the case is classed with apyretic cases, except when other data point to the probability of pyrexia, such data as night sweats and emaciation.

The cases are all arranged according to the number of months since the onset of the trouble, and this to a certain extent aids one in estimating the value of the data.

*Cases showing Cough and Expectoration with no other symptoms.*

Symptoms have persisted	1 month and under.	1 month to 2 mo's.	2 mo's to 3 mo's.	3 mo's to 6 mo's.	6 mo's to 12 mo's.	12 mo's to 2 years.	Over 2 years.	No data.	Total.
Negative .....	1	4	4	5	7	5	3	1	30
Positive .....	0	0	1	6	1	2	2	0	12
Percentage positive .....	0	0	20.0	54.5	12.5	28.5	40.0	0	28.5

The number of cases in the above table is hardly large enough to enable one to draw conclusions, but when one considers that only 42 out of 441 cases sent in, had merely the

the presence of cough and expectoration to direct the physician's attention to the possibility of phthisis, and yet twelve of these proved to be tuberculous upon microscopic examination, one is forced to the conclusion that, if phthisis is to be diagnosed in the early stages it is important not to wait until classical symptoms exist but to have a microscopic examination of every case in which persistent cough and expectoration does not yield to treatment.

*Cases showing Cough and Expectoration with Pyrexia or Emaciation or Sweats, or all these Symptoms*

Symptoms have persisted.	1 month and under.	1 month to 2 mo's.	2 mo's. to 3 mo's.	3 mo's. to 6 mo's.	6 mo's. to 12 mo's.	12 mo's. to 2 years.	Over 2 years.	No data.	Total.
Negative .....	19	23	9	35	27	5	13	3	134
Positive .....	3	14	10	22	27	8	2	1	87
Percentage positive ....	13.6	37.8	52.6	38.5	50.	61.5	13.3	25.0	39.3

This table does not require discussion. It shows from the number it includes the class of cases of which physicians are suspicious and upon which they require the further light of a microscopic examination of the sputum.

*Cases showing Cough, Expectoration, Pyrexia or Emaciation, with physical signs of Disease of the Lungs.*

Symptoms have persisted.	1 month and under.	1 month to 2 mo's.	2 mo's. to 3 mo's.	3 mo's. to 6 mo's.	6 mo's. to 12 mo's.	12 mo's. to 2 years.	Over 2 years.	No data.	Total.
Negative .....	8	8	10	10	11	4	4	0	55
Positive .....	4	7	8	12	8	6	3	1	49
Percentage positive ....	33.3	46.6	44.4	54.5	42.1	60.0	42.8	100	47.1

The numbers are unfortunately not very large in this table but it is interesting to note the much larger percentages of positive cases.

*Cases showing Cough, Expectoration, physical signs with no Pyrexia or Emaciation.*

Symptoms have persisted.	1 month and under.	1 month to 2 mo's.	2 mo's. to 3 mo's.	3 mo's. to 6 mo's.	6 mo's. to 12 mo's.	12 mo's. to 2 years.	Over 2 years.	No data.	Total.
Negative .....	0	1	2	5	5	2	4		19
Positive .....	0	1	2	3	4	1	1		12
Percentage positive .....	0	50.	50.	37.5	44.4	33.3	20.		

We finally have 26 cases in which Hæmoptysis was given as having occurred at some period of the disease. These cases are arranged in the following table :

*Cases showing Hæmoptysis, with or without other symptoms.*

Symptoms have persisted.	1 month and under.	1 month to 2 mo's.	2 mo's. to 3 mo's.	3 mo's. to 6 mo's.	6 mo's. to 12 mo's.	12 mo's. to 2 years.	Over 2 years.	No data.	Total.
Negative .....	2	0	1	2	6	1	2		14
Positive .....	1	1	1	3	3	1	1	1	12
Percentage positive ....	33.	100.	50.	60.	33.	50.	33.	100.	46.1

In 10.4 per cent. of the positive cases pain was given as a symptom, whilst it was present in only 6.9 per cent. of the negative cases.

In answer to the question as to exposure to infection, 28.4 per cent. of the positive cases gave such a history, whilst it was only present in 17.2 per cent. of the negative cases.

In considering the results given in the foregoing tables, the question naturally arises as to how far the negative results are reliable where the symptoms point to evident disease of the lungs persisting in some instance for a very long time. It is claimed for them that they are only reliable in so far as negative results can be after careful microscopic examination. In answering the physician the value of a negative result is pointed out and it is suggested that another specimen be sent if symptoms continue suspicious. It is remarkable, in how few cases second specimens have been sent, and in so far as histories have been obtained apparently the negative results have been largely confirmed. One physician wrote that all results during the preceding four years (some 25) were confirmed by the subsequent clinical histories.

It would be very strange, however, if a certain percentage of those reported negative were not tuberculous.

Another point of very great importance is brought out by an examination of the tables. That is the necessity of an early examination of the sputum. Thirty-one cases were diagnosed positively within the first two months of the disease, and when one remembers the great success in the treatment of such early cases by modern methods, the value of this result cannot be over-estimated.

*Diphtheria.* There were 375 swabs from suspected cases of diphtheria, examined during the year; 147 of these gave positive cultures of the diphtheria bacillus. With a large number of them cards were sent in, but very little of value can be extracted from them. The most interesting facts to be determined in these cases are the duration of the disease and the persistence of the bacillus after the disappearance of the membrane, and the effects of the use of antitoxin upon these conditions. All these data are asked for on the cards, but on account of absence of system on the part of physicians using the laboratory the returns are very incomplete. The majority of the physicians have been willing to use the laboratory for diagnosis, but have preferred not to do so in regard to release from quarantine. This is, of course, absurd, and demonstrates pretty conclusively that many physicians do not rightly understand the significance of the facilities offered them by the Provincial Board of Health. They seem to think that these facilities both in diphtheria and tuberculosis are simply to assist them in making a diagnosis. They may assist them in this, but their primary object is to protect the public health by making certain the diagnosis of two diseases which are a menace to the public health. In the case of diphtheria they fail in their duty if, after a positive diagnosis is made, they do not continue to send swabs until the throat is shown to be free from infection, and in connection with this the experience of all similar laboratories should be remembered, viz., that at least two negative examinations should be obtained before the throat is declared free of infection.

*Typhoid.* With the 164 specimens of typhoid blood there were only a small number of cards. From these the following data have been obtained. There were 33 cards from positive cases, and from these it was possible to determine approximately the day of the disease upon which the reaction was obtained :

On the 3rd day.....	1	On the 10th day.....	5
" 4th " .....	1	" 12th " .....	2
" 5th " .....	5	" 14th " .....	5
" 7th " .....	10	After the 14th day.....	4

That is, that more than half of these positive reactions were obtained within the first week. It is probable that the others would have given similar results if they had been sent earlier.

*Cerebro-Spinal Meningitis.* An interesting feature of the laboratory work of the early part of the year was the receipt of four specimens from cases of suspected cerebro-spinal meningitis. The epidemic form of this disease is now known to be due to a specific organism called *diplococcus intracellularis meningitidis*. It differs from the *diplococcus* of pneumonia, which sometimes causes meningitis, in its staining, cultural and pathogenic characters, so that in material from the meninges it is usually possible without much difficulty to differentiate the two forms. The chief differences are as follows: By Gram's stain *diplococcus intracellularis* does

not stain, while *diplococcus pneumoniæ* stains, it is more difficult to cultivate than the pneumococcus and dies out more rapidly in cultures, while the pneumococcus is very pathogenic for mice and rabbits, the *diplococcus intracellularis* is only slightly so.

The rapid death of the organism makes it difficult usually to get a culture, especially if the cerebro-spinal fluid has been allowed to stand any length of time after removal from the body. Even in fresh material, in which the microscope shows many organisms it is necessary to make several cultures as only a percentage of them show any growth. It is consequently hardly possible to hope for a positive diagnosis by culture with material sent to the laboratory from a distance, and the diagnosis would have to depend largely upon the negative cultural results and the staining peculiarities.

With the appearance of epidemics in various parts of this continent within the past year (notably in Boston, Baltimore and Philadelphia) it was of special interest to try and decide whether the Ontario cases were due to the organism of the epidemic form or to the *diplococcus* of pneumonia.

The first specimen was received March 20th. It was from a fatal case with an illness of about 48 hours. The specimen consisted of about 25 c.c. of bloody cerebro-spinal fluid, with a white sediment and containing white flocculi. On centrifuging it separated into a layer of reddish sediment with a clear blood-stained fluid above. A number of cultures were made from the material on different media, but they all remained sterile. Stained preparation showed that the sediment consisted of red blood corpuscles, polynuclear leucocytes and large mono-nuclear leucocytes. Certain of the polynuclear leucocytes contained diplococci somewhat flattened  $1.0m \times 0.75m$  in pairs. These organisms did not take the Gram stain. Two grey mice were inoculated, one subcutaneously with  $\frac{1}{2}$  c.c. of the fluid, the other intraperitoneally with  $\frac{1}{2}$  c.c. of the same material. Both animals lived, the second showing slight illness for a day.

We had then in this case a purulent cerebro-spinal fluid containing intracellular diplococci, which did not take the Gram stain and which apparently were dead when received.

The presumption was that this case of cerebro-spinal meningitis was the epidemic form. Within a month three other specimens were received from the same county; but in no case could a positive diagnosis be made, although in one the same intracellular diplococci were found. In another only serum tubes, inoculated by the physician who made the *post-mortem*, were sent, and as they remained sterile nothing could be made out. In the other the specimen was badly packed and was broken before it reached the laboratory.

In recent epidemics of this disease the method of lumbar puncture has been extensively used as a means of diagnosis, and in some cases even as a therapeutic measure.

The puncture is made between the third and fourth lumbar vertebrae about one centimetre from the middle line, a large sterilized hypodermic needle being used detached from the syringe; the needle is pushed slowly upwards and inwards, the entrance of the point into the spinal canal being at once shown by the flow of cerebro-spinal fluid from the open end, sometimes under considerable pressure. Some of this is caught in a sterile tube and a number of cultures at once made.

In fatal cases of cerebro-spinal meningitis this should be done if a *post-mortem* is not permitted, as a positive diagnosis can only be made by bacteriological examination.

It is important that physicians throughout the Province should recognize the importance of making as certain as possible the diagnosis in cases of this disease, since, if there is any danger of an epidemic, such as occurred in Boston, precautions should be taken.

#### DISEASES OF ANIMALS.

*Rabies.* During 1899 five specimens from cases of suspected rabies were sent into the laboratory.

May 3rd. The spinal cord of a sheep which had died of supposed rabies produced by the bite of a wandering dog. Two rabbits were inoculated but they remained unaffected, so that we must conclude that the case was not one of rabies.

July 11th. The head of a dog was received which was supposed to have died of rabies. One rabbit was inoculated subdurally with an emulsion of the medulla; fifteen days later it showed symptoms of paralytic rabies and died on the twentieth day.

Aug. 1st. The head of a cat supposed to have had rabies was received. One rabbit was inoculated subdurally but was unaffected by the inoculation, being well three months later. It was evident that this case was not rabies. Cultures from the brain of this cat gave negative results.

Aug. 26th. The head of a Newfoundland dog was received in the laboratory, also the cord of another dog and the cords of two cattle, all supposed to be cases of rabies. On account of the way in which the material was packed only the head of the dog could be used for inoculation. One rabbit was inoculated subdurally; this animal died seventeen days later, but unfortunately during my absence, and its symptoms were not observed nor was material kept for a second inoculation. These cases were probably true rabies, but on account of the doubt about the cause of death in the rabbit a positive opinion cannot be given.

Sept., 29. A fox terrier dog was brought to the laboratory supposed to have died of paralytic rabies. Two rabbits were inoculated subdurally with an emulsion from the medulla of this dog. The first animal showed symptoms of paralytic rabies seventeen days later and died on the nineteenth day; the second animal showed symptoms on the eighteenth day and died on the twentieth.

Of the five suspected cases two proved to be rabies, one was most probably rabies and the remaining two were not rabies. Of the three cases of rabies one was from Toronto and the other two were from the southern peninsula of Ontario, the district in which practically all our cases of rabies are found.

During the autumn and winter months there have been quite a large number of cases in Buffalo and the neighborhood, and it is rather surprising that we have not had cases from the Niagara peninsula due to importation. It would be well for Local Boards of Health along the main roads through the southern counties to keep a sharp lookout for suspicious animals.

*Anthrax.* July 27th. The spleens of two cows which died with symptoms and post mortem findings suggestive of anthrax were received in the laboratory from Mr. Burger, V.S., Listowel. Bacteriological examination of the material demonstrated the presence of the anthrax bacillus in both specimens.

*Black Shoulder or Quarter Evil.* November 15. Muscular tissue from an animal supposed to have died of anthrax was sent to the laboratory by Mr. Armstrong, V.S., Gorrie. Microscopic examination showed a bacillus somewhat like the anthrax bacillus. A guinea pig was inoculated subcutaneously with a little of the juice from the specimen. It died next day with the same bacillus observed in the specimen present in all the tissues. Aerobic cultures made from the original specimen and from the inoculated animal gave no growth of the bacillus seen in the tissues, but in anaerobic cultures it grew well; it was isolated and studied and proved to be bacillus chauvii, the cause of the disease, and usually called black shoulder or quarter evil. The absence of an aerobic pathogenic bacillus demonstrated the absence of anthrax. This case is of interest because it is the first one of this disease which has been diagnosed bacteriologically in the laboratory of the Board. It is apparently endemic in a number of districts in Ontario and it is important that outbreaks should be accurately diagnosed because of the fact that it is sometimes confused with true anthrax. True anthrax is a much more dangerous and fatal disease in animals and has this additional public health interest that it sometimes produces fatal infections in man.

#### BACTERIOLOGICAL EXAMINATION OF WATERS.

Throughout the year, in examining water samples bacteriologically, special attention has been paid to bacillus coli and colon-like forms; at the same time, of course, anything looking like the typhoid bacillus has been isolated and studied. In a number of instances bacillus coli has been found, but it is surprising that it is missed in waters where we would expect to find it. In every case it is absolutely necessary that the study of the particular organism should be carried out thoroughly, the amount of gas produced in fermentation measured and the percentage of relationship of  $\text{CO}_2$  to H established by Theobald Smith's method, before we can make a positive diagnosis of the presence of bacillus coli. As an example of the difficulty of establishing the presence of bacillus coli or bacillus typhosus in water I will detail an investigation into 21 samples of water-

from the Indian Reserve in Tuscarora township, Brant county. The majority of the waters were more or less polluted. Cultures were made at 37° C by adding 1 c.c. of the sediment of each sample to 25 c.c. of bouillon growing for forty-eight hours and plating. All forms like bacillus coli or bacillus typhosus were isolated and studied. Thirteen colonies from as many different samples were isolated and marked typhoid-like, i.e., the surface colonies in the plates showed the leaf-like margin and veining characteristic of the typhoid colony. All these colonies were not equally typhoid-like, but they all bore a resemblance. Two of them proved on further culture to be liquefying fluorescent forms. Two proved to be nonliquefying spirilla. All the rest on further culture and replating failed to show a typical typhoid colony and none of them gave the agglutination test with undoubted typhoid blood.

Eight colonies were marked possibly colon-like; one proved to be a liquefying organism; five gave a negative indol reaction and did not ferment lactose; two only seemed to answer to the tests for B. coli in the fermentation tubes and both were quite pathogenic for guinea pigs.

Other forms of interest on account of their probable relations with bacillus coli were isolated from other samples of water, but lack of time prevented a systematic study of them.

With the view to studying the extent of the occurrence of the nitrifying organisms in wells and natural waters, some tests were made of samples received in the laboratory.

Investigations carried on by Jordon and Richards (Mass. State Board of Health Rep. 1890) seemed to indicate a wide spread distribution of these organisms in natural waters.

In my own experiments, 400 c.c. lots of a sterilizing Wnogradsky solution were placed in sterilized flasks and were inoculated with the samples of water by allowing them to sediment in the ice-chest and then drawing off 5 c.c. of the water with sediment in sterilized pipettes. In the first test one flask was inoculated from tap water, one flask from a public water supply derived from a brown river water, one flask from a well, not polluted; and a control flask was inoculated with soil. Examined from time to time the control showed progressive nitrification so that a month later there was only a slight trace of ammonia. The other three flasks showed no nitrification.

In a second test nine flasks of sterilized solution of a similar constitution were inoculated as follows: one as control from the previous earth culture, one from a public water supply from an underground source of known purity and seven from wells more or less polluted. A month later the first two flasks showed almost complete nitrification whilst the other seven showed no trace of it. The experiments would have to be carried out much farther to enable one to draw any conclusions, and it is hoped as time permits to continue the investigation.

In the chemical examination of the 29 samples of water sent in, the usual hygienic analysis was made, and there is nothing special to report in connection with them.

#### MISCELLANEOUS INVESTIGATIONS.

Among the miscellaneous investigations of the laboratory was a study of the character of a bacillus found in grass, which resembles the tubercle bacillus.

It was first described by Moeller as occurring in this situation, but apparently its first recognition was by Rabinowitch in butter. Its occurrence in butter has undoubtedly given rise to error, as it is apt to be reported as the bacillus of tuberculosis.

Its growth in culture media is not unlike that of the bacillus of tuberculosis except that it is much more luxuriant and rapid. It stains with ordinary tubercle stain, and in cover glass preparations looks so like the tubercle bacillus as to give rise to doubt in one not well acquainted with the true form. Inoculated in large doses in guinea-pigs, it gives rise to a disease of the nature of a pseudo-tuberculosis, small tubercles consisting of granulation tissue being found in the peritoneal cavity and liver. In smaller doses it gives rise to a slight indisposition and loss of weight with infiltration and tubercle formation at the point of inoculation and subsequent recovery.

It has not been described as producing a natural infection of cattle.

I found this organism present in several specimens of hay, and from one I succeeded in isolating it in pure culture. The resulting cultures showed the form to be identical



with Rabinowitch's butter bacillus, and animal experiments showed it to have a very slight degree of virulence.

I was able to show that its peculiar staining characters are due, as in the bacillus of tuberculosis, to a fatty envelope, but contrary to what occurs in bacillus of tuberculosis this fatty envelope can be readily dissolved off with alcohol so that after boiling for ten minutes in alcohol the organism no longer takes the peculiar stain, but stains like any other form.

Dorset, of Washington, has shown that Sudan III. is a stain for the tubercle bacillus on account of its affinity for fatty materials. My observation confirms this, but shows that Sudan III. will not stain the grass bacillus, the reason being apparently that the alcohol in which the dye is dissolved removes the fatty envelope before the dye can act.

This organism shows, in culture especially in those in grass, a tendency to true branching which demonstrates its affinity with the streptothrix group. Another member of this group was isolated from a polluted barnyard well which did not show any resemblance to the bacillus of tuberculosis in its staining character, but which upon closer study showed a superficial resemblance to the branched diphtheria bacillus which has been described by some observers.

This streptothrix in early culture was quite characteristically branched, but as it continued to grow in culture media it developed a tendency to break up into short bacilli, very diphtheria-like when stained with Loeffler's methylen blue and the branching was lost. The organism was very slightly pathogenic for guinea pigs, producing a small abscess at the point of inoculation which was slowly absorbed, and efforts to increase its virulence by continuous passage have so far failed. The characters of this organism were embodied in a paper before the Bacteriological Committee of the American Public Health Association at its Minneapolis meeting.

The undoubtedly close relationships of the bacillus of tuberculosis and the bacillus of diphtheria with the streptothrix group make it important that all forms of this group should be carefully studied, especially in regard to their pathogenic manifestations.

The routine work of the laboratory has absolutely prevented the carrying out of any extended hygienic investigations, and this will continue to be the case until additions are made to the staff, the importance of which has been pointed out in previous reports.

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## PART II.

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## CHAIRMAN'S ANNUAL ADDRESS.

BY DR. J. A. MACDONALD, HAMILTON.

TORONTO, 1st Feb'y, 1900.

GENTLEMEN,—It is once more my function to address you on the duties which have fallen to the lot of the Board during the year which has passed, and to bear testimony to the zeal of the brethren who compose the Board in the work which they have undertaken to perform. None have sought to evade their duties as members; as has been shown, not only by their regular attendance, but by the evidence which they afforded that the business of the Board and its usefulness had been the subjects of their study when at their homes.

The year has not been very eventful in the history of disease within the limits of the supervision of the Board. No destructive epidemic has visited us, but we have sufficient proof of the benefits of that sanitation of which this and other such boards are the custodian and caretakers. Smallpox has threatened in one or two districts under the guardianship of the Board. Our members know the history of that disease, its contagiousness and its infectiousness, the desolation which before the days of Jenner marked its course, and the terrible disfigurement which it left in those whom it failed to destroy. There are not many histories of mild epidemics of smallpox, but it has been reserved for our day to see one, and to what are we justified in attributing it? Must we not say that the alleviated form of the disease which has passed over certain parts of our land has been because of the small number of subjects who were unprotected by vaccination, so that the malady had not the opportunity of manifesting, as it were by multiplication, its old-time malignity. Much enquiry is going on, on the part of our more scientific brethren, as to the nature of the infectiousness of smallpox. May we not hope that the result of their studies may be, that the world may be saved from a repetition of the old smallpox history.

It is the honourable function of such public institutions as this Board to make clear to public comprehension the usefulness of such measures of disease prevention as active enquirers in this field of science may bring to light. We claim that by institutions, and among them by this, our own, much most serviceable knowledge is being spread among the people, and that thus this Board has been of much service to our Province of Ontario. The public is learning that it is worth while to be at trouble and expense for the purpose of sanitation, slowly perhaps, and not without opposition and detraction, but still it is learning the good arising from the work of the sanitarian, or arising from the existence of such a Board as this, because of the concentration of power on behalf of the public welfare which the functions of the Board mean. The occasions on which advice and help have been sought here have been numerous, and the members will bear witness that on no occasion have the seekers after instruction or assistance expressed themselves as being disappointed.

We are not to think, however, that the functions of the Board are to win the approbation of all men. Prevention of disease will be a long time before being easily made by general consent. There will always be many critics who think they know more than they have at any time taken the trouble to learn, and such individuals are always very positive of their knowingness.

These observations have been thought to be timely because of the extraordinary re-action which, in these days, is much in evidence against the value of the discovery of Jenner—a re-action which seems to be gathering strength.

By reason of that discovery, and the nearly universal advantage taken of it for a century or more, smallpox had been nearly stamped out from among civilized people; and now many in their security seem to regard a belief in the history of that horrible disease as a superstition, and are doing what they can to cast discredit upon it. A man in authority in this city has delicately said that the operation of vaccination is beastly.

It is for this Board and other such boards to present their testimony against this cruel heresy, and to see to it that until some better preventive has been found against the hideous smallpox, the public be taught that no child of more than three months old should remain unvaccinated.

Much space has been taken up with this matter, but the anti-vaccination crusade is among the evils of the day. Looking forward to a remedy, may we not propose to the medical profession that it be made part of certain functions, which some assume as special, that the vaccination of the infant, within three months after birth, without charge therefor, be a necessary sequence to the greater function which shall have preceded. The medical profession, by such means, stamped out smallpox a hundred years ago. The Board, through its ever-active secretary, has had to deal practically with other evils than smallpox, and with other diseases, notably typhoid fever, of which the causes seem to be ever present, and against which incessant vigilance on the part of the sanitarian is needed. It is needless to refer to the bad habits of individuals or of communities as agencies in the production of this disease. Those habits exist and are likely to continue. It is for public institutions such as this Board to watch for the results of those habits, and to institute means for their correction, if that be possible, while the chief object may seem to be to indicate means for relief for their evil results.

It is my part now to say farewell and to thank the brethren who have constituted the Board for their considerate kindness. I trust I have never forgotten what has been due to them during my occupation of the chair, or during the time I had previously been a member of the Board, and I truly say that I shall always think with satisfaction of my association with them.

J. D. MACDONALD.

## REPORT OF THE COMMITTEE ON EPIDEMICS.

### I. QUARTERLY REPORT FOR THIRD QUARTER.

(By the Secretary.)

September 11th, 1899.

*Mr. Chairman and Gentlemen:*

The past quarter has been signalized in many parts of the Province by dry weather, though until August the Georgian Bay and Lake Huron district had an unusual rainfall. In the cities of the districts of Lake Ontario the dry weather has served greatly to prevent decomposition of organic matters, and the summer diarrhoeas of infants have been slight, the *bacillus enteridis* of Klein having no great facilities for development. With the added coolness and closing of the schools the prevalence of the acute contagious diseases has been but slight.

Owing to several deaths in Anderdon and North Colchester townships, in Essex, from diphtheria, I visited the district on July 14th, and found the small village of McGregor with still a number of cases. The people were mill hands, mostly with small houses, and owing to the mildness of many cases, no household isolation was being thoroughly maintained. Dr. Jenner, M. H. O., of North Colchester, having charge on one side of village, was doing what he could, in the absence of better means, to keep the people at home. The outbreak was, at last accounts, at an end.

In August, owing to the long continued presence of diphtheria and a notable number of deaths, I visited Hanover, in Bruce county, situated on the line of Bentinck and Brant townships. I found the secretary of the board of health of Bentinck, with the board, were active in isolating all cases, and the medical health officer of Bentinck unusually active. Owing to the class of population home remedies seem to have been generally tried before a physician was called, and later attendance of the cases was given up too soon, while patients were allowed to go to school before any swabs attested their throats clean, and disinfection by the local board was not supervised but only ordered. As but one family have the disease at present in Brant Township, it is hoped the outbreak will be completely ended; but a mortality of 13 in six months in a population not exceeding 4,000 must be looked upon as serious.

*Smallpox.*—The incidence of smallpox in spite of its prevalence in neighboring States has been slight. A case was introduced from New York State into Toronto, resulting in 3 cases in all with no deaths; while from Cleveland a case of supposed chickenpox was imported resulting in some 27 cases in all in Walkerville, Windsor and Sandwich East townships, with one death. The disease was of the remarkably mild type which has prevailed for two years throughout the United States, and presents from the stand-

point of the natural history of disease a most interesting study. The outbreak in this district has been treated as smallpox, cases were isolated in pest-houses and the disease is now at an end.

*Hydrophobia.*—The re-appearance of this disease has occurred in several districts in such a way as to again bring it forcibly to the attention of the Board. The laboratory report will deal with it more extensively ; but both as regards its prevention and treatment of persons attacked in Canada some comprehensive action is demanded.

*Anthrax.*—The outbreaks of this disease are becoming more frequent in this Province, and in the absence of any thorough action by the proper authorities, buried carcasses are continuing to create spots where its indemicity is being established. Introduced probably in every first instance by foreign hides or wool to the sole leather tanneries and woollen factories, it has extended to the flats along streams where their effluent waters flow. The latest cases have been on the stream below Listowel, where some 10 cattle in all have died this season. Others died last year, while the disease is reported to be endemic within a limited area of Ellice Township some 7 miles from Listowel.

*Pollution of Streams.*—In consequence of an outbreak of anthrax I visited Listowel early in August and found there had been cases of anthrax and an action pending by the owner of some cattle as against the town and owner of tannery for pollution of the stream. I examined the course of the stream, the position of the drainage from factories, houses, etc., and found that a main sewer can with a relatively small cost be conducted through the town which it is probable will be found capable of carrying the sewage without pumping to a point where a filtering plant can be established. The progressive character of the town demands such a measure.

As will be seen from correspondence, the question of stream pollution at Berlin and Waterloo by the town sewage has again been brought up. In consequence of complaints I visited Berlin in July, and with the engineer and chairman of the sewer commission inspected the sewage farm. Its condition was very similar to that found last year, an increased area is under cultivation with mangolds and the beds are rather better worked. The sewage discharging from the subsoil tiles was to the eye quite clear, and seemingly as pure as the main stream of the creek.

With several acres of land covered by the sewage which flows on to the flat beds to the depth of a foot or more, it is inevitable that a certain effluvium nuisance should be created. It was remarkably free, however, from this at time of my visit, though complained of by farmers in the neighborhood as having been oppressive on a damp still evening. Year by year however the soil of the farm is improving, and with an engineer having the matter in charge, the improvement will be still more rapid and scientific.

The complaints from Waterloo Township re the pollution of the Bridgeport creek have resulted in action being taken by the town authorities of Waterloo to compel connection with the main sewer by offending citizens.

*Sarnia Oil refining nuisance.* In correspondence submitted it will be seen that complaints were made to the Board that the refuse from the Sarnia oil refinery was polluting the St. Clair River, making it unfit for drinking water for residents along the river below. In consequence I visited the town and in company with Dr. Oliver the medical health officer, made an examination of the premises and methods of the company. It will be found of interest to the Board if a somewhat detailed report of this be submitted.

The works of the Imperial Oil Company are situated on twenty acres of ground, through which a small stream runs and empties into the St. Clair river. The following information was received from Mr. Stillman, the obliging superintendent in charge : When the present company took the works over there were four stills for refining crude oil in operation. Eleven stills have since been put in in 1899 already and eight more are being constructed. To these stills oil is pumped from probably 150 tanks, which are simply great cisterns dug in the clay and covered over tightly with iron plates. Some 60,000 bbls. of crude oil are refined in a single month and it is either brought in tanks or led in pipes to the tanks from the oil fields.

The crude oil goes to the first series of stills, where it leaves, after distillation, the heavy lubricating oils. From these the distillate is pumped to a series of other tanks from which, as refined, it is again pumped to the desulphurizing still, where it is treated by passing through a crude copper compound.

From there it flows to the refining stills to be again distilled and brought up to the flashing point 85°. Thereafter it is treated with sulphuric acid and soda ash.

The lighter gasses and naphtha are both distilled off from the crude stills, and thus with steam also given off are condensed and form the gasoline products.

From the heavy oils left in the crude stills are made paraffin, lubricating oil, axle grease, etc. From works of such extent it will be apparent that even the condensed steam from the stills will create a notable flow of oily water, but after the water for all the processes and boilers is considered the situation as described will be understood. Two pumps with 12 inch suction mains to the river are going all day, and 2,000,000 gallons of water are pumped daily. Thus it follows that at various points drains are seen discharging large volumes of water into the channel of the creek, always somewhat discolored by the crude oil or tarry products in suspension. These would and did formerly in fact flow into the river, but as all have an economic value it is the object of the operators to recover all of this overflow possible.

To this end what the refiners call a trap has been constructed, which simply means that an excavation in the channel and bank of the creek has been made in the clay and a large tank of planks is set therein and puddled about tightly with clay. This tank will be 85 feet long and 25 feet wide when completed, which was nearly the case at the time of our visit. The manager stated that it was during the time that the tank was being enlarged that a certain amount of refuse oil escaped down the river and which was the time the complaints were received. This large trap or tank is divided by planks into seven sections. As No. 1 fills with the oily water, the water is passing below into tank No. 2, the oily water always coming to the surface. By this means, the oils are practically all in a position to be re-pumped to the tanks since in the last tank very little black oil is seen on the surface. To catch the oil again the open mouth of an iron pipe, connected with the pump is set so as to pump off from the surface of the tanks, taking in oil and water.

All the effluent matter flows through a well over the mouth of the sewer leading to the St. Clair. In it nothing more was evident than the iridescence often seen on creeks where oils from swamps have accumulated.

Your secretary, while greatly interested in the details of the operation, and much pleased with the effectual means taken to recover the waste oil products, pointed out how necessary it was to prevent the pollution of the river as many settlers below had only the river water as their source of domestic supply, and suggested in case of further complaints that a further filtration be given the effluent by passing it over coke beds. The manager at once replied that they were most anxious to give no cause of complaint, and as they had ample coke from their own products they would gladly do this if any further complaints were made. When the extent of the daily output is considered the slight amount of oily substance escaping was very remarkable.

The gas works of the town were also visited owing to complaints made of pollution by their waste products. The works were in good condition but no attempt was being made to carefully collect the tarry products which pass over with the washing of the gas. A trap and if necessary filtration through a coke bed will remedy the evil complained of, the discharge being now into a shallow part of the bay, creating thereby an effluvium nuisance. Dr. Oliver agreed to notify the manager of the company to this effect.

*Railway Cattleyard Nuisances.*—As will be seen in correspondence, the summer months, as last year, have produced their large list of complaints regarding effluvium nuisances. Of this class the most troublesome this summer have been owing to the widely increasing commerce in hogs. The report found in pp. 65, 67, of the Annual report of 1898, states regards cattleyards, amongst the other causes:

"That owing to badly located cattleyards and stables as well as defective construction and the absence of means for cleaning, these materials, harmless at first in themselves, are allowed to accumulate and decomposition allowed to become productive of most serious nuisances."

The first investigation of complaint made by your secretary was a complaint of a hog-feeding establishment at Creemore, near Collingwood. Owing to complaints last year to me large drovers there who had splendid pens and facilities near the station, were forced with others to keep no droves of hogs for feeding in the village during the summer

months, but other pens in the town, usually with a few hogs, were allowed, and against one of the larger of these a neighbor made a very serious complaint. At the time of my visit not many hogs were kept and the nuisance was at a minimum. I pointed out in meeting with the local board that the remedy was not so much to deal with individual complaints as to prevent hogs being kept in the village at all, and on examination of their amendment to Schedule B. that their by-law as it then stood prohibited this at present, at any rate in summer. They had not understood this, as the amendment had been framed to deal with the drovers. I suggested they utilize its powers in dealing with those cases where complaints were made, but further correspondence shows that they immediately notified everyone by public notices not to keep pigs and summoned one offender when the magistrate dismissed the case by saying the by-law was not so intended. It is simply another illustration of the failure of our local health machinery.

Correspondence indicates the present state of the Dunnville, Paris and Forest railway cattle yard cases. Owing to the demand for an investigation into the cattleyards at Thamesville, under section 72 of the Act, I visited the town on Tuesday, Sept. 5th, and found the situation as set forth in the report herewith submitted. The same day I visited Chatham and sat with the Local Board of Health, which, as seen in the correspondence has had the same difficulty to contend with. I there learned that pressure from the local board had resulted in having drainage put in from the G.T.R. yards and appliances for flushing the floor. The inspector was instructed to see that arrangements are made for the systematic removal of manure after each day the yards are used, and that flushing of the floors be carried out at the same time. Forest town has not been heard from lately and it is assumed the action taken by the local board has been effective.

*Pollution of Parkhill Creek.*—On Sept. 7th your secretary visited Parkhill and met the local board of health to discuss a long-standing nuisance caused by the pollution of of the creek flowing through the town by Skinner's laundry. As will be seen by the correspondence submitted, an attempt was made to deal with the water last year and a crude tank with charcoal had been put in to intercept the soapy effluent. It was found to have been badly arranged and at time of my visit was not being used. A conference with the Reeve was had by your secretary and details of a plan were suggested by which a receiving tank and discharge tank were proposed, from which the effluent would be discharged to subsurface tiles laid in a neighboring lot. Compliance was promised and the local board agreed to give the principals a reasonable time to instal the new works.

Many other matters have been arranged by correspondence during the quarter.

All of which is respectfully submitted,

P. H. BRYCE, for the Committee.

## 2. FOURTH QUARTERLY REPORT OF THE COMMITTEE ON EPIDEMICS.

Nov. 17th, 1899.

*To the Chairman and Members of the Provincial Board of Health :*

GENTLEMEN: Your Committee begs to report that with the exception of localized outbreaks, there has been no serious prevalence of contagious disease during the past quarter. As will have been noticed from the monthly statistical report published, there have been rather more deaths recorded from typhoid fever than during last year. The appearance of this disease has in most cases been in those parts of the Province, whether in towns or country places, where well-waters are still used; and especially in sections where the long drought prevailed during the summer and permeable soils have lain above the water-table. The area of pollution seems to spread from privies and other collections of fecal matter year by year and the lower the water-level the more dangerous such pollution becomes. Such a condition is illustrated in places such as Brantford, Woodstock and Galt, and notably in rural localities, where the knowledge of such dangers and the manner of avoiding them progresses but slowly.

Your secretary investigated a quite serious outbreak in the village of Campbellford, where the condition already noted was well illustrated, excepting that the underlying



rock was very near the surface. The village is situated prettily on the river Trent, on the flat, and slopes of high hills on either side of the river valley. The limestone outcrops at places, and at others is covered with a shallow soil, water-soaked from the springs in the hill-side. Wells sunk in such places to the rock are shallow, and the movements of water from the higher grounds most invariably carry a grave pollution with it. Privies and other pollutions existed in some cases in close proximity to wells, which are veritable plague centres.

The town has a public water supply for fire purposes only, taken from the river below the town. With the water-power at command for pumping it would be a simple and inexpensive matter to lead water from pure spring supplies on the hill-side to a well, thence to be distributed over all the town. Here and there borings into the rock have likewise given a good water.

Such sources were strongly urged for adoption by your secretary and it is hoped a by-law will shortly be submitted for this purpose. It is the opinion of your Committee that the powers of the Board under the Act to insist on such a remedy when out-breaks of typhoid occur should be tested, as well as the power to compel local boards or councils to extend the water pipes to areas where the disease prevails from such causes, and thereafter to cause the closing of wells in such areas. There seems no doubt in the opinion of your Committee that the Act carries with it such powers in the same way as it does the construction of isolation hospitals in the case of smallpox and diphtheria.

*Smallpox.*—As the Board is aware smallpox of a mild type has appeared in an area of Essex county where cases had already appeared in June and August.

In consequence of reports of its prevalence reaching the Board, a medical inspector of the Board visited the district on November 8th and investigated the facts. These are set forth in the appended report of Dr. Hodgetts, Medical Inspector.

At the request of West Tilbury a physician was sent on the 11th to attend all cases; but as on his report measures in some of the municipalities for isolation of suspects were imperfect, and as quarantine was threatened by the authorities of Detroit whence the first cases of the disease came, it has been thought necessary to continue the inspection in the district, till satisfactory action on the part of the local authorities is reported.

General vaccination is reported as being proceeded with; and it is hoped that the disease will be promptly stamped out. Owing to the generally mild character of the disease your Committee would advise that a circular be prepared to send out to physicians setting forth the general symptoms and signs of this disease.

*Diphtheria.*—Owing to the general knowledge of the contagious character of this disease local authorities generally are active in its suppression. The imperfect results too often following their action are however due to a too early freeing of cases from quarantine. This has been the case in the instance of Paris, where the disease appeared early in the year; but practically disappeared during the summer holidays. Cases, however, appeared again early in October, as also cases of scarlatina; and in almost all outbreaks this failure to isolate for a sufficient length of time has been the cause of further cases.

It is expected that shortly an isolation hospital will be erected, when there is good reason to hope means will exist whereby its further extension will be prevented. A very serious menace to the public health further exists in some places, owing to the practice of the people, known as Christian Scientists, to not report cases of the disease occurring in their families. The danger is aggravated from the fact that public funerals may be held; and in one instance referred too in the correspondence, the anomaly occurs of no means existing whereby legal burial can take place. The matter calls for such legislative action as will define the position and duty of health authorities in such cases.

The laboratory of the Board is extending its facilities for the exact diagnosis of this disease; and it is to be hoped that local officers will insist on investigations of all cases suspected to have occurred, before burial is permitted. Some further assistance in the laboratory is however required to cope with the work which is constantly increasing and which cannot be promptly dealt with by a single officer.

*Tuberculosis.*—The monthly reports continue to note the prevalence of deaths from consumption, and the appalling fatality from this disease is once more shown in the Registrar-General's returns for 1898.

The total deaths recorded in 1897 caused by it were 3154, and from other contagious diseases 1763, and in 1898, 3291; while those from smallpox were 0; scarlatina, 222; diphtheria, 634; measles, 115; whooping-cough, 126; typhoid, 405, giving a total of 1,502. What this means may be judged from the following returns: 1891 gave for all six diseases, 2,656; tuberculosis, 2,379. 1892—for all six diseases, 2,764, and tuberculosis, 2,592.

Your committee has again to ask, can nothing more be attempted, nothing done to prevent this enormous mortality from tuberculosis?

In May last an international congress met at Berlin to discuss this single disease.

Dr. Krieger dealt with occupations in their relations to the disease, illustrating this by the mortality in those living with and nursing consumptives; those leading sedentary lives and living in vitiated air, and those breathing irritating dust.

Dr. Böllinger, of Munich, showed the relations between tuberculosis in animals and the human subject. The identity of the disease in men and cattle and hogs was shown. Again it is stated that milk and its products from infected cattle are most to be dreaded. Its frequency in hogs was shown as being due to feeding infected milk, as also in children.

Prof. Flugge, of Breslau, with other pathologists, again set forth the fact, no longer admitting discussion *that the tubercle bacillus is the direct cause of all varieties of consumption in the human subject and also of bovine tuberculosis*.

Prof. Frankel, of Halle, said every human being infected with tuberculosis and every infected animal were centres from which the disease is spread.

Dr. Roth, of Potsdam, Prof. Huebner, of Berlin, and Prof. Kirchner referred to the various means of its prevention; while Prof. Rubner spoke of how to prevent it in factories and dwellings of the poor. House and factory inspections were insisted upon so that over-crowding, imperfect ventilation and a dust-laden atmosphere might be prevented.

The great Prof. Virchow referred to the need of testing animals with tuberculin in order that milk from such might be prevented from being used.

Methods of treatment were dwelt upon and Curschmann of Leipzig, Kobert of Rostoch Brieger of Berlin, Sir Hermann Heber of London and Dettweiler of Falkenstein, all dwelt, upon the *open air* treatment. The general conclusion was arrived at that recovery can only be looked for *when the disease is attacked in its early stage*.

Sanatoria were discussed in all their bearings. Landesrath Meyer claimed that apart from the duties of governments and the efforts of charitable persons and societies, there was a special obligation on those likely to be benefited by the erection of sanatoria, as for instance large employers of labor and insurance societies.

In view of such a *resumé* of facts already known to your Board, your Committee would urge that the Board present these facts directly to the Government and Legislature and ask all health authorities and physicians to assist it in asking that provision be made whereby district sanatoria can be established in the Province.

### 3. FIRST QUARTERLY REPORT OF THE COMMITTEE ON EPIDEMICS.

Feb. 14th, 1900.

Mr. Chairman and Gentlemen:

You committee begs leave to report that the quarterly reports of deaths from contagious diseases for November, December and January continue to show the public health to be free from any great prevalence of fatal communicable diseases. It is further satisfactory to know that the annual report of the Registrar-General for 1898 just being issued, indicates another notable decline of deaths from these diseases. The total decrease over 1897 was for all diseases 1,263. This means a decline of 0.7 per 1,000, of which the decline in communicable diseases gave 22 per cent., or these diseases caused but 5 per cent. of death from all causes. The reduction in diphtheria alone was 342.

*Smallpox.*—As was reported at the last Board meeting in November in the statement of the Medical Inspector of the Board, smallpox had become prevalent in Essex county. Owing largely to the benign character of the disease, the work of your Inspec-

tor as well as that of the medical health officers of the district, proved most irksome owing to the difficulty in maintaining quarantine. After the first fright this disregard has always in certain communicable diseases proved a difficulty; persons most subject to panic at one moment, passing to rashness in the next. As may have been expected, these difficulties have made themselves felt to your secretary, who, as will be seen from correspondence, has been again and again called upon to take action in local disputes.

The following table presents a statement of outbreaks so far as reported :

<i>Essex.</i>		Cases.	Deaths.
Maidstone Tp .....	30 cases	.....	None.
Rochester Tp.....	128 "	.....	"
Belle River village .....	2 "	.....	"
N. Tilbury Tp .....	26 "	.....	"
W. Tilbury Tp.....	59 "	.....	"
E. Tilbury Tp.....	2 "	.....	"
<i>iddlesex.</i>			
Caradoc Tp.....	2 cases early diagnosis and vaccination. Source, United States...		No deaths.
<i>Lambton.</i>			
Sarnia Town .....	2 cases early diagnosis and vaccination. Source, United States...		"
<i>Frontenac.</i>			
(Sharbot Lake) .....	1 case, early diagnosis and vaccination. Source, not known, probably a tramp.....		"
<i>York.</i>			
Toronto Junction.....	19 cases. Source, Freight R. R. Conductor.....		"
Toronto .....	2 cases.		
<i>Brant.</i>			
Brantford.....	1 case, early diagnosis. Source, Cleveland, U. S.....		"

It will thus be seen that this Province has been the theatre in which a smallpox epidemic, as far as the experience of this Board extends during a period of 18 years, of an extent and persistency in mildness wholly unprecedented. The last report of the United States Main Hospital Service dealing with reports from different States, gives the following particulars for the six months ending January 26, 1900.

	Cases.	Deaths.
Alabama .....	4	..
Colorado.....	7	..
Georgia.....	60	..
Illinois.....	75	..
Louisiana.....	271	34
Massachusetts.....	2	2
Missouri.....	43	4
North Carolina.....	105	..
Ohio.....	55	..
Virginia.....	49	9

And some other states with a few cases.

It will thus be seen that many hundreds of cases of smallpox have occurred during these three months, and that, except in instances as that before noted in Prescott, Dundas and Leeds last year, and recently in New Orleans and Michigan, have had a virulence greatly below the normal.

It must not be forgotten that such mildness is not unusual. In 1894, for instance, during the great Chicago epidemic which extended to Detroit and thence to Ontario, causing 20 distinct outbreaks in six months, there were 35 cases and 4 deaths. In the Strathroy cases the remarkable fact occurred that the first person who had the disease had it in so mild a form that he was never sick, was seen by a doctor once, and then accidentally, and his disease was not diagnosed, and yet was the occasion of communicating it his room-mate, who recovered, yet gave it to a school-boy who died and whose father took it from him and also died.

But, nevertheless, the broad fact exists that to a hitherto unknown extent, the persistency of the mildness has been so great that physicians and health boards are being put in difficult and delicate positions, first to know what the disease is, and second to perform their duty to the public. To know that this has occurred to hundreds of physicians in the United States, does not make the task less irksome here.

Your Committee speaking with whatever light the experience of 18 years of continuous dealing with outbreaks and epidemics can give, realizing that this Board under the general statute is required to take such action as the circumstances demand for preventing the spread of communicable disease, desires to set forth such facts regard

ing the disease as will enable the Board and public to accurately estimate the situation as it exists. To this end it proposes to ask and answer the following questions :

"Is the disease we are dealing with smallpox?"

While this is the primary question, there are others subsidiary of great importance. Let us apply the tests.

1st. *As to its contagiousness.* That this is extreme has been illustrated by the present Toronto Junction cases, accounts of which have filled the papers for a week past. From one case admittedly mild, not isolated, at least 18 adult persons exposed directly to him have taken the disease within the usual incubation period of from 12 to 15 days.

2nd. *Is it Chickenpox?*—While speaking generally, all text-book authorities state that chickenpox practically never attacks adults, yet your Committee is personally convinced that instances do occur; but they are equally certain that no authority and the experience of no expert has ever known one mild case of it to have caused healthy adults in succession to become inoculated, some of them after but a single temporary exposure.

3rd. *What class of persons are attacked?* Not only were adults attacked, but it happens that at least the first six cases seen personally by a member of your Committee, were all persons who had never been vaccinated. In the outbreak in Essex the report of Dr. Bryans on 11 families with 85 inmates seen during a period of two months, every detail of whose history became his study, illustrates exactly the same fact; and similarly in the cases of Walkerville and Windsor, seen by two experts, the medical officers of those exposed towns.

4th. *What persons were not attacked?* The persons who were not attacked were practically in every instance, persons who had had smallpox, (See Bryan's report of West Tilbury, also recall the fact reported that a person in the boarding-house at Toronto Junction who has had smallpox and who is quarantined therein, has been employed as a nurse for the men, being referred to as an immune) or persons who have well-defined old vaccine marks. The Essex cases again show that imperfect or nearly obliterated marks or recent imperfect vaccinations failed to protect. If persons were vaccinated with potent virus within a day or two after exposure, the usual experience was obtained, that the vaccine having a more rapid course became an absolute protection and smallpox did not occur.

5th. *Could it be any disease but Smallpox?* This question to every physician, is answered by the previous statements; but we may state further, that in all the cases at Toronto Junction recently seen, (a) Notable preceding malaise occurred with an attack ushered in with pain in the back, head, vomiting, chills and fever; (b) the subsidence within 48 hours of fever with the sense of wellness for a day or two, then followed by (c) the secondary rash progressing for the usual four or five day period to complete maturation, ending in cases seen by your secretary in umbilicated pustules, in two or three patients becoming confluent, and others semi-confluent. It had taken 8 to 10 days from its onset for the disease to arrive at this stage. Chickenpox does not usually become pustular, while the rash follows the onset of the disease within 24 hours; there is no secondary rash, and the successive crops of the first have matured usually within 48 hours.

Measles plays no part similar to this and no other disease we know enters into the question, and none but smallpox will fulfil the conditions.

6th. *Biology of the Disease.* We are aware that it is not safe to dogmatize in matters not capable of scientific proof; but in respect of the attenuated virulence of any zymotic or germ disease we are no longer in ignorance, though in some particulars our knowledge is still incomplete. Thus we know that in cholera, bubonic plague, scarlatina, diphtheria, etc., in those climates where any of them are endemic, it is the invariable experience that different outbreaks vary in virulence from the benign to the most malignant while the same outbreak may exhibit in different patients the several stages of severity. The biological reasons worked out in most of these diseases are, (a) *an inherent difference in type caused by the environment of the germ*, whether in the particular individual or in some instances its existence external to the body. This may be due to climate, season, or presence in the system of the patients of other antagonizing or assisting microbes or conditions. This condition seems to have actually been demonstrated in the production of vaccine virus, which according to Copeland and the biologists of the Paris Vaccine Institute, is but a modified bacillus of smallpox.

(b). *The resistance of the vital powers of the individual to the germ of any particular type.* This varies with the constitution, the temporary state of health, the age of the individual, as where the adult seldom takes chickenpox or scarlatina etc., etc. This fact is of much importance, since if the germ though primarily benign, invades the person with small resistance or in bad environment the rapid succession of generations of the germ may, and indeed often does, cause them to attain a virulence, as when a virulent pus germ is present in the smallpox vesicle lessening the cell resistance, or when the disease develops under filthy conditions, when it will have developed a new race of germs, which, if finding such unsanitary conditions perpetuated, will become as it were the permanent type—during it may be a wide-spread outbreak.

(c) *With this is usually set down by the bacteriologist the amount of the dose.* In other words, the number of germs that an individual may become inoculated with.

Thus we must, from the biological standpoint, accept the position that by any one of these several tracks the present outbreak of smallpox may attain a gradual or sudden virulence which would demand the most heroic measures for its suppression. That this may take place at any moment is proved in the two distinct outbreaks in January and February, 1899—one the Prescott case and the other the Leeds or Welford cases; and within the last month in the Louisiana cases.

7th. *What attitude must this Board assume towards the disease?* Your Committee would recall the diagram in last year's report of smallpox deaths in Ontario for thirty years. The Board knows what this means; the records of municipal and governmental expenditure show what it means. Except in one year—1894—in the decade preceding 1899 the Province had not a single death from smallpox since 1889. Except in 1894 and in isolated municipalities in other years, the Provincial Board is aware, the local boards know and the public as individuals are cognizant of the fact that vaccination has been practically neglected by the people of Ontario during this period. A younger population exists to-day practically unprotected.

*Bubonic Plague.* Your Committee would bring to the Board's notice the fact that for the first time in history the *bubonic plague* has invaded the western hemisphere and that the epidemic since its appearance in China in 1893 has been slowly but surely extending.

A summary of the chief facts regarding it is due the public, with a view to prevent alarm by enabling it to understand the character and mode of spread of the disease.

It has within the period of history ravaged from time to time Europe, Asia and Africa. During the present epidemic its true nature as a germ disease has been disclosed, and many epidemics are referred to by writers before the Christian era, but that of the 14th century is best known to us. It is estimated that one fourth of the population of Europe, or 25,000,000, died in the several epidemics of that century. The present plague appeared in Hong Kong in 1893, thence by ships was carried to Bombay, Poonah and other parts of India by ships; thence by the Red Sea in 1899 to Alexandria and to Portugal. Eastward it has spread slowly to Japan and Formosa during the past year, causing 2468 cases in Japan, and 1866 deaths in Formosa, and thence to Honolulu in 1899, where it is still present. From Oporto, where it appeared as usual among ship laborers, it has spread to Santos in Brazil.

What it means in India or to a similar population, is seen in the statement of the last statistics that there have been in Bombay presidency 220,907 cases, and 164,000 deaths.

During the last 50 years, in 30 of which it has been recorded in some Asiatic country its most northern limit was in Astrakan, Lat. 45°, but it has been present in Britain and Sweden in previous centuries.

Its present interest for us is the constant and increasing traffic between British Columbia and the far east; the fact of a crowded Chinese quarter in Victoria, and the fact that the disease being in Brazil, as usual in the shipping quarter, it may naturally progress towards northern sea-ports if not carefully guarded. In proof of this the British ship *J. W. Taylor* arrived in New York on 18th Nov. 1899, with two cases on board, having also lost one man at sea from the disease. The ship came from Santos. Prompt measures were taken and it did not extend. The cases at Honolulu are reported to have been largely suppressed.

As already stated it is a germ disease, first discovered by a pupil of Prof. Koch, Dr. Kitasato and his assistants, sent by Japan to study it in Hong Kong.

It is essentially due to inoculation and occasionally to inhalation of the germ into the lungs or into the stomach. Dr. Simon a pupil of the Pasteur school has apparently definitely explained its inoculation by the medium of fleas in the houses of the poor, these having previously been parasites on rats, which in all the epidemics seem to have died often in great numbers, often before the human outbreak occurred.

It is a febrile disease in which the poison has been carried from the point of inoculation, as the bite of a flea, along the lymphatic vessels and results in buboes or pustules at one or several points, while head symptoms are prominent in severe cases. Some are slight cases or ambulant cases; some are pulmonary cases, and seen, when the type is virulent, ending in a general septic state, and often fatal within 48 hours. In very severe cases hemorrhages under the skin and mucous membranes occur, and buboes may not have time to form before death supervenes. This is "the Black Death" of the older centuries.

As may be expected the multiplication of the bacilli produce by-products or *toxins* in the blood, and Yersin of the Pasteur Institute has discovered also their antitoxin. The bacilli will exist for at least 15 days and probably grow external to the body in organic matters as of streets, lanes, houses if protected against sunlight and desiccation. It is readily killed below 212° F. and in solutions of germicides.

The antitoxin is obtained from healthy horses in a manner similar to that for diphtheria, herbivores not being readily susceptible to the disease.

Isolation for a month after apparent recovery is advocated by Kitasato, as the germs may still linger in clothes, etc. Disinfection and cleanliness as for other diseases is essential; while house-to-house inspection, closing up or burning dwellings unfit for habitation, and a crusade against rats, is a routine measure.

Essentially for the present must we look for the protection of our sea-ports by the Quarantine authorities and by community of action between health authorities, wherever danger appears.

The immunity of inoculation against it with the serum lasts a fortnight, and requires to be repeated if danger is present. Protection to the extent of 85 per cent. with Haffkine's protective vaccine is got with one inoculation and complete after a second or third inoculation.

This is rather a vaccination with a toxin than a protection with an antitoxin.

The incubation period of the disease is 24 to 72 hours.

The regulations of the Marine Hospital Service, U.S., are published in the report for Jan. 26th, 1900, and state:

1st. That passengers should not be vaccinated against the plague on shipboard, as it may confuse diagnosis at port of arrival.

2nd. Baggage from infected ports must be disinfected at port of arrival.

3rd. Passengers from infected ports should be detained 15 days before embarkation, or if not must be detained at port of arrival.

4th. Passenger ships on arrival at port must not be given *pratique*, but must be lightered and cargo disinfected.

5th. Animals should not be shipped from infected ports.

All of which is respectfully submitted,

P. H. BRYCE.  
J. J. CASSIDY.

## REPORT ON SMALLPOX OUTBREAK IN ESSEX CO., PRESCOTT, STORMONT AND LERDS IN JAN. AND FEB., 1899.

BY CHAS. A. HODGETTS, M.D., MEDICAL INSPECTOR PROVINCIAL BOARD OF HEALTH.

TORONTO, June 28th, 1899.

*Peter H. Bryce, Esq., M.A., M.D., Secretary Provincial Board of Health:*

SIR,—Acting under instructions of January 28th, last, I proceeded forthwith to the districts in the eastern portion of the Province as Inspector and continued the duties of the office for a period of four weeks.

The districts visited and in which smallpox was found to exist were :

GROUP I.—East Hawkesbury Tp., Chute à Blondeau, Vankleek Hill, Osnabrook Tp., Williamsburg Tp., Cornwall.

GROUP II.—Wolford Township.

The local authorities of the municipalities adjoining these infected districts were visited for the purpose of either initiating or furthering compulsory vaccination, and the work of vaccinating the employees on the public works in the vicinity of Iroquois and Cardinal was materially aided.

The appearance of cases of smallpox in the different municipalities at about the same date, together with the report that in some sections the local authorities had not acted promptly, made the outbreak assume a somewhat alarming character and which looked more serious still in one instance where the cases happened among men employed on the public works then in progress. Although this was the case, I am pleased to report that as a result of effectual quarantine, perfect isolation and prompt vaccination not a single case has occurred outside the suspects who by diligent search were found out and quarantined.

The fact is to be regretted, however, that, owing to imperfect quarantine placed over the house in Osnabrook township, near Farran's Point, seven persons who had been exposed escaped. They were all subsequently quarantined, and only in one instance was the disease spread, the man having gone to Waltham, Pontiac Co., in the Province of Quebec, where he and others were ill with the disease. It might be added that six of the men left the house before my arrival in the district, and the last left just after my inspection of the district and notification of his leaving did not reach me for some days after.

In the municipality of East Hawkesbury, where the disease happened entirely in French-Canadian families, the local authorities, having, from causes best known to themselves, failed to appoint a medical health officer were without an executive head when the first case was reported, and consequently were slow to inaugurate any measures either of a preventive or curative character; as a result, the disease became more widespread than in other municipalities, and consequently the expense much greater than it would have been had the provisions of the Health Act been followed out.

In the township of Osnabrook the chief executive officer did not act as promptly as the urgency of the case demanded, as he wished first to place liability of costs upon the Provincial Board of Health, seemingly overlooking the fact that his first duty was to enforce the law and prevent the spread of the disease, leaving the question of cost to be settled after as between the Provincial and local authorities.

As the result of the adoption of efficient measures in a prompt manner, and in striking contrast to the methods adopted in these two municipalities, should be noted the action of the local boards of health of Cornwall, Vankleek Hill, Williamsburg and Wolford townships, where the disease was kept within the limits of the premises where it first appeared, materially lessening the cost.

*Origin of Outbreaks.*—Group I.—A party was held on New Year's eve at the house of Louis Desjardines, there being present several parties from Coteau, in the Province of Quebec, where smallpox already existed. On January 14th, the daughter, Victoria, was taken ill whilst working at the house of Mr. Kirby; she was subsequently sent home (21st) January, was seen by Dr. Lynch on 25th, and who immediately notified the reeve.

On January 13th an infant of Louis Desjardines, aged 5 months, who had with its mother been present at the aforesaid party, was taken ill at Vankleek Hill while on a visit to that place. The case was diagnosed as one of chicken-pox, was permitted to leave the house of the Durocher family and returned with the parent to Chute à Blondeau, where it died just previous to my arrival there.

The first case in the Durochers' family was January 28th, which was reported to the M. H. O. by the same physician who attended the supposed case of chicken-pox.

The cases in Chute à Blondeau and East Hawkesbury either had their origin from Mr. Kirby's house, from which the Desjardines patient was removed, or from the patient after her removal home to the village and before the character of the disease was known.

From East Hawkesbury the disease was carried to the Whiting house in Osnabrook township, near Farran's Point, by some workmen who had been at the party in Desjardines house, and who remained in the township for some little time after; in this

house the first case happening in Williamsburg township and that reported from Cornwall had their origin.

*East Hawkesbury and Chute à Blondeau.*—The first case happened here January 15th and the second February 1st, just previous to the date of my inspection of the district. During the time intervening between these two dates practically nothing had been done by the local authorities. The first patient was taken ill while working at the house of the reeve and was removed from there to her home in Chute à Blondeau January 21st, and so far as could be ascertained it was not pronounced as smallpox until Jan. 25th, when she was seen by a local practitioner for the first time. He at once notified the local authorities. It was not until after conferences with both the local board and council that measures were adopted of a character to restore confidence and place beyond doubt the belief that the spread of the disease would be checked. That the measures adopted at this time were adequate to cope with the outbreak has been proved beyond a doubt by the results, for but few cases happened outside the houses I had placed under quarantine. This fact is worthy of more than passing notice, as it was stated in the public press, on official authority of the Health Inspector of the Province of Quebec, after a hurried trip made by him to the district, that the measures just referred to were "inefficient, etc." Whilst not questioning the right of the Quebec official to visit the infected district, yet I do think it would have been much better form for him to have conferred with your officer before making public such a damaging and alarming statement, for which there was not the least tittle of truthful evidence.

When once the authorities of East Hawkesbury had been assisted to put the necessary sanitary measures in operation, they acted with commendable energy.

*Vankleek Hill.*—The first case reported in this municipality was Jan. 28th, although an infant, (the one mentioned previously) was taken ill Jan. 13th with what was supposed to be chickenpox. At the time of my arrival the local authorities had adopted measures of quarantine but had made no arrangement for the medical care of the cases, the M. H. O. Dr. McKinnon, being temporarily in charge; he however, subsequently assumed sole charge together with the cases in East Hawkesbury.

*Osnabrook Township, (near Farren's Point).*—Here again there was a failure on the part of some of the local authorities to act promptly owing to reasons local in character. The disease broke out in the Whitney house, wherein boarded some of the men employed on the public works close by, and the escape of seven of these men made affairs look grave for a time. The local board of health when once informed as to the measures to be adopted, acted in a most commendable manner. The Whitney house, being roomy, was used as a hospital and a pavilion was erected for the quarantined, efficient police put in charge and Dr. Jameson engaged to attend the cases jointly with those in the adjoining township.

*Williamsburg Township.*—The four cases here were in the same household. The house was in an isolated position. The local board acted with commendable promptitude and adopted every measure suggested for the handling of the disease.

*Cornwall.*—Although the case happened on First St., close to the business portion of town, yet the prompt and efficient means adopted by the town of which Dr. Alguire is mayor, resulted in a manner most gratifying to all.

Group II.—*Wolford Township.*—The origin of the disease here will forever remain a mystery.

The work of the local board was prompt and efficient, no pains being spared to provide for the patients. The disease was confined to the house where it first appeared.

*Vaccination.*—In municipalities where the disease existed, compulsory vaccination was the rule, and in all adjoining municipalities it was ordered to be enforced and as a result thousands of primary vaccinations were made.

Assistance was given the authorities in those sections where the public works were in operation on the St. Lawrence and I am pleased to note the ready assistance given by the several contractors whereby the work was greatly facilitated.

The use for the first time, to any considerable extent, of "glycerinated lymph" is excuse for comparing the result with that following the use of points. I found that while its use seemed at first a little tedious and the absorption of prepared lymph slower,



yet the development subsequently of the typical vesicle with the accompanying constitutional disturbance, were as a rule, so markedly free from those unpleasant symptoms we so often see and which is to be feared have made the general public look with some feelings of dread on this most useful and efficient preventative operation, that I cannot but speak with approval of the preparation and recommend its more general use.

Appendix A is the tabulated report of the medical men in attendance on the case.

In group I. there were 30 cases, 10 male and 20 female, with 4 deaths among each class. 8 males and 18 females had never been vaccinated. 16 had been vaccinated after exposure but in most cases the disease appeared shortly after resorting to this preventative measure making it impossible to judge of its efficacy.

In group II. there were 6 cases, 2 male, 4 female, with 2 deaths, 1 male and 1 female, 2 males had never been vaccinated and 3 females.

Before closing I would note the uniform kindness with which the local health officers and boards everywhere received me and the cordial co-operation always evinced, thus showing a desire to carry out the Health Act in conformity to the wishes of the Minister of the Department. All of which is respectfully submitted.

CHAS. A. HODGETTS, M. D., L.R.C.P. London, England.

## VI.—REPORT ON THE OUTBREAK OF SMALLPOX IN ESSEX COUNTY.

BY C. A. HODGETTS, M.D., MEDICAL INSPECTOR.

Feb. 15th, 1900.

*To the Chairman and Members of the Provincial Board of Health:*

GENTLEMEN,—I have the honor to submit the following report of my work as Provincial Medical Health Inspector in the counties of Essex and Kent, for the period from Nov. 7th to Dec. 23rd, 1899, during the prevalence of smallpox, chiefly in the former county.

In company with Dr. Briens, Essex, and Dr. Millen, Maidstone, M.H.O., I visited a patient in the house of Mr. Stowe, Maidstone township, in November. This case had been first seen by Dr. Briens and pronounced by him one of smallpox and so reported to the local authorities; his diagnosis having been doubted by them, he promptly notified the Provincial Board of Health of the facts. From the history given and the appearance of patient at the time of the consultation I agreed with Dr. Briens and pronounced the case one of smallpox, and forthwith instructed the M.H.O., in his duties as to the strict quarantining of the household by the aid of competent and trustworthy sanitary police, the ordering of compulsory vaccination by the council, and the providing of proper medical attendance on the case.

Although this was the only case which had been reported to your Board, I came to the conclusion that there were many other cases scattered throughout the adjoining townships of Rochester, North Tilbury and West Tilbury, and forthwith proceeded in company with Dr. Briens to examine other houses, acting with Dr. Amyot, M.H.O., Rochester; Dr. Anderson, M.H.O., Belle River, and Dr. Anderson, M.H.O., West Tilbury, in their several municipalities, with the result that I found 23 other cases in the townships of Rochester, North and West Tilbury, and the village of Belle River. In this latter municipality the case was under partial quarantine,—the house being placarded as "Infectious Disease," but in the townships no precautions whatever were taken.

In the case of the municipality of Rochester, which had been informed by their M.H.O. some two weeks before my inspection that a case of smallpox existed in the township and that he had quarantined and placarded the house, the action of the board of health was in my opinion most blameworthy,—ignoring their M.H.O. they called in two local physicians, and upon their pronouncing it "chickenpox," raised the quarantine. It was my good fortune to meet the members of this Board when I told them of the character of the disease, and instructed them as to the proper measures to take for stamping it out, but they treated the matter very lightly and indifferently, relying on the diagnosis of the two local physicians.

To the lack of prompt action on the part of the medical health officer as well as to that of the local board, is in my opinion largely due the fact that most of the subsequent cases happened in this municipality. Had an appeal been made by either the medical health officer or the board of Rochester, to your Board a much more satisfactory report could have been made.

Upon ascertaining the nature and extent of the outbreak I at once informed the local health officers and secretaries of the facts, and ordered compulsory vaccination, quarantining of infected houses by efficient police patrol, and the employment of medical attendance for the cases.

The appearance of the rash, was in most of the cases seen at the time of my first inspection, of such a typical character that I had no hesitation in making the diagnosis of smallpox,—indeed in all the 24 cases that I then saw, even in the mildest there was sufficient to warrant isolation by the local authorities as suspicious cases, and quarantining the houses until further developments.

That the disease was mild in character there can be no doubt, as there have been to this date 218 cases with but one death.

That it is either modified or prevented by vaccination—recent or remote, is a fact proved frequently during the progress of the outbreak.

That those who had previously had smallpox were immune was demonstrated in five cases to my personal knowledge.

That the period of incubation was the same as the more serious forms of the smallpox has in nearly every fresh family attacked been proved, on investigation; and only prevarication on the part of members of the infected households has prevented me ascertaining it in every case.

The difficulties surrounding this outbreak were chiefly:

The wide spread character of the outbreak before preventative means were adopted.

(a) The mild character of the disease.

(b) The appearance of chickenpox in adjoining municipalities—among English families.

(c) The ready discussion of the subject in the public press by medical and other experts and the Medical Health Officer of Detroit, who had never seen one of the cases.

(d) The aversion of some French Canadians to vaccination and their suppression of information and concealing of cases.

With any of these difficulties in the way the suppression of the outbreak must take some time, but with all of them to face it seemed a task most hopeless, but one by one they were met, and with the co-operation of the three medical men who attended the cases and the medical health officers of the municipalities I am pleased to report that at the date of my leaving the district, Dec. 23rd, 1899, although there had been reported 218 cases in fifty five houses, yet 109 of these had recovered, leaving 109 in 29 houses—many of whom would be free from quarantine before January 1st, 1900.

Before concluding I would refer briefly to the fact that it was found that much of the glycerinated lymph used in this outbreak failed to produce the typical vaccine reaction and as a consequence much of the vaccination had to be done over again. The reason for this unfortunate result seems to be due to some fault in the product itself and not to any method of procedure in the operation of vaccination.

Respectfully submitted,

CHAS. A. HODGETTS, M.D., L.R.C.P., London, England.

Medical Inspector.

*History of outbreak.* On July 1st, 1899, the daughter and granddaughter of Guilbeault, town line, North Tilbury, visited at the house of a French family near Walkerville and returned home about July 6th, 1899. About ten days after the return the grandchild was taken ill. A doctor pronounced it chickenpox and it spread to the rest of the family except those who had had smallpox before, thence across the road to the house of one Lajeunesse, Rochester township, and the family of Logan in the next lot north. It seemed to smoulder in these houses during the months August and September, as the members of the families bore testimony to their having had the disease.

This is previous to the disease being known to exist.

A young man who was suffering from the disease with the eruption well out attended a dance at the house of Tellier about the middle of October and all the cases I saw at the time of my first inspection had come in contact either at the dance or some other place with this man.

## REPORT OF THE COMMITTEE ON THE CAUSE AND PREVENTION OF CONTAGIOUS DISEASES (OF THE AMERICAN PUBLIC HEALTH ASSOCIATION.)

READ BY P. H. BRYCE, M.D.

October 31st, 1899.

*Mr, President and Gentlemen of the Association :*

Your committee begs leave to report that during the past year it has endeavored to keep in touch with the reports of progress which have been made in the elucidation of the causes of the several communicable diseases which are of practical interest and importance to those whose duties call upon them to take action with regard to them.

The limits of this report make it imperative to confine our remarks to those points which, in the evolution of scientific medicine illustrate some new phase of disease or demonstrate some new fact whether it be the causation of some disease hitherto unknown, or the prevention of some malady, which is now regarded as preventable.

*Smallpox*—The past year has once more brought prominently to the attention of all officers of health the fact that this disease, fortunately so long quiescent, only requires an opportunity to become disseminated with all its pristine readiness, if not with its old time virulence. Certain areas of the continent have the disease prevailing to a very serious degree, and health authorities have experienced in many instances great difficulties in preventing its spread. One very important reason for this has existed in the remarkable variation in virulence, which has marked the disease in many instances. Thousands of cases have occurred within the year in the United States with a mortality not exceeding five per cent. The explanations from the biological standpoint of this would prove of extreme interest were we in possession of them ; but owing to the great difficulties which have been experienced in cultivating the microbe of the disease, almost nothing has been established. We would seem to have to fall back on the old theory of acclimatization, or failing this the supposition that the habits of life of the people along with climate, have prove inimical to the development of virulence in the germ of smallpox. It has been a general observation that the virulence of the disease is notably less in sub-tropical than in temperate climates ; but we have witnessed during the past year a winter of remarkable severity, incapable developing the usual virulence of the disease, except in a few instances. That the disease may at any moment become malignant was, however, seen in the Province of Ontario, where out of 36 cases, originating it is believed in a case from Cleveland, 11 deaths occurred.

That there are biological conditions in the individual, influencing the development of virulence in the microbe, may legitimately be concluded from the extremely valuable experimental observations made at the Institute of Animal Vaccine, Paris, by Bécclère and Chambon.

The experiments were made with the object of determining the effect upon vaccine lymph produced from vesicles in vaccinated animals previously treated by means of hypodermic inoculation with the virus. A very notable reduction in virulence was the result ; while similar results were obtained in animals, inoculated subsequent to an injection of blood serum from vaccinated animals, as horses and cattle, and from men and monkeys suffering from smallpox.

The conclusions briefly summed up, were :

1st. The serum of a heifer taken fourteen days after inoculation is endowed not only with immunizing properties, preventive and curative, but it also produces when mixed with vaccine, an anti-virulent effect.

2nd. It produces in horses and probably other animals, the same anti-virulent properties as in cows and man.

3rd. Vaccination produces the anti-virulent property on the serum, however, the inoculation be made, whether by the skin, the blood, or the deeper tissues.

4th. The serum from convalescents from smallpox exerts the same anti-virulent action on vaccine as that from variolized animals, as monkeys.

5th. The anti-virulent substance of the serum of man and animals immunized against vaccine and variola has a stable composition, offers great resistance to heat, light, time, persists when dried and does not readily putrefy.

6th. The blood takes several days after inoculation to acquire anti-virulent properties fully; in the heifer after from nine to thirteen days, and is at the very moment that the vaccine or variolous virus loses all activity.

7th. The period of vaccinal immunity varies much with different species, but the anti-virulent property of the blood goes on increasing, and may disappear completely, although the skin in the same person may still resist re-inoculation with vaccine.

8th. The anti-virulent property varies with different persons, but persists for twenty-five years, and even fifty or over, with persons against variolous and vaccinal infection.

9th. The production of the anti-virulent substance in the course of vaccinal or variolous infection, and its appearance in the blood plasma, constitute a reaction of defence of the organism intimately allied to the arrest of the morbid process, and to the development of immunity. We do not yet know whether this substance acts directly on the infective agents as a virulicide or whether it acts as a stimulant on the tissue cells of the organism.

The practical diagnostic difficulties, owing to the very notable variations of the normal signs of the benignant disease have doubtless been experienced by many of us; but practical experience must have similarly led to the conclusion that nothing less than the application of the time-honored measures of complete isolation of patients, and the vaccination of all exposed persons, have proved efficacious in stamping out an outbreak.

As regards, however, the biological meaning and interpretation of this remarkable modification of the type of smallpox, I take pleasure in referring to the quite remarkable references to the general principles underlying the difficult question of immunity and modification of virulence in disease, contained in that portion of this report prepared by our confrère, Dr. J. E. Monjars, of San Luis Potosi, based on his own experiments.

Thus, after referring to the continued presence in the alimentary and respiratory areas of morbid germs, indefinitely, until the opportunity for their invasion arises from within the system, he says:—

"We must, therefore, give less credit to the influence of contagion in the development of transmissible diseases, and modify our present explanation thereof, which gives such a great importance to the contact of pathogenic microbes in the system, as we have seen that in some cases this contact is entirely innocuous.

"For us the contagion arises not when the microbe comes into contact with the surface of our tissues, but when it commences to flourish inside of them, giving rise to the development of a culture that at first is strictly local."

Again, after referring to the influence of cosmic influences, as temperature, humidity, electrical influences, etc., the report states:—

"In fact, we cannot entirely separate a body in a state of activity, such as the cell, from its environment without endangering the phenomena of its life, or vitiate these conditions without injuring the system of which it forms a part; its activity producing certain products, as has been demonstrated by Hallopeau and Gautier in Moscow.

"The causes that may influence the cellular activity and determine the appearance of toxic substances in the system can evidently, as well proved by H. Boucher, only proceed from two sources—either from the system itself, which alters nutrition, according to the conditions of strength or weakness in which it finds itself, or from the outside matter in which it moves and by which it is surrounded on every side, and whose qualities produce an incessant variation.

"It is therefore in these media, so variable in their composition, where the specific determining causes find that principal co-operation without which the other causes generally are left impotent for the development and spread of transmissible diseases. It is in the extensive variations of the environment that we must look for the mechanism that presides over the appearance of the infectious principle."

Nothing can be of greater importance than the thorough investigation of such problems of environment as are thus referred to by Dr. Monjaras, and in our northern climates, where for months the whole population are domiciled in what I have called artificial climates, had we means adequate for the purpose where the direct influence, not alone of microbic air impurities, but of the increase of carbonic acid and organic animal products, and of the decreased amounts of oxygen and its nascent forms due to electrical action play their parts. Further than this, we might determine with accuracy the influence of decreased atmospheric humidity, and the effects of the unequal distribution of temperatures on the body by cold wall currents, cold floors and draughts upon the thermic centres of the body, which govern the cellular functioning organs.

The work in this field hitherto done is but preliminary to what is necessary to be done before the relative importance of the remedial cause and the exciting cause of each contagious disease will be determined.

*Insects as Disseminators of Disease.*—The year has been fruitful in experimental work and discoveries in a field, which if not new, is one which has hitherto received but little attention.

*Diptera.*—So early as 1870, Davaine, attributed to flies an important part in the spread of the anthrax, from dead infected materials to living animals; and in the past five years positive experiments have added much to our knowledge of the subject. This subject was briefly but very admirably set forth in a paper by Dr. Roman Ramirez, Lacubaya, Mexico. He pointed out that the external formation of many *diptera* is specially adapted for the collection of all sorts of small objects on account of the microscopic hairs that cover their bodies and legs. He further points out that several flies, by sucking the blood of diseased persons, can transmit disease.

Dr. Veder, in the same transactions, points to certain localized epidemics of dysentery investigated by him, as caused by flies through carrying infection from faecal matter.

In a paper read before the section, on "Tropical Diseases," of the British Medical Association meeting held in August last, Dr. George H. F. Nuthall, Demonstrator of Bacteriology at Cambridge, England, whom this Association is proud to call a member, and a native of America, has given this whole subject in review in a most interesting manner. They play both a passive part as carriers of disease, and a more active part in some species as becoming the hosts of the several germs, and thus through bites, inoculating the wound through their virus.

Kitasato, in Hong Kong, in 1894, noticed many dead flies in his laboratory, and caused the death of an animal by inoculating it with the contents of a fly. The fly was seen to contain bacilli of the plague. Hankin, in India, in 1897, found that the excreta of certain ants contained virulent bacilli after being fed on rats dead of plague. He thought such ants might be carriers of the disease to living rooms, through their excreta being deposited as dust.

Similarly Manson, Haffkine and others, have found the cholera spirillum in the intestines of flies, and sterilized milk has been found to have been inoculated with flies taken in a prison where cholera prevailed.

In the last annual report of Surgeon-General Sternberg, the part played by flies in the dissemination of typhoid fever in the permanent military camps of the United States army during the Spanish-American war in 1898, is referred to. The report states: "At the time of the outbreak and rapid spread of the disease, all the camps were suffering from what many reports characterized as 'the plague of flies.' Clouds of these insects swarmed about faecal matter and filth of all kinds deposited on the ground or in cesspools or sinks, and conveyed foul and infectious matter thence to the food exposed while in preparation in the camping kitchens, or while being served to the men." Inasmuch as some diptera are blood-sucking flies, and as Celli and Alessi are reported having isolated virulent typhoid bacilli from the excreta of flies, it is in keeping with what is known now regarding the mosquito, that such may actually inoculate the blood with the virulent bacilli of disease.

Equal or even greater interest attaches to the work first systematically begun by Dr. Patrick Manson, L.L.D., when in China he first made the observation that the *filaria Bancrofti* is communicated from one individual to another through the agency of the mosquito; interest in which was still farther notably aroused when Dr. Major Ross, in Calcutta, described the life-cycle of the haematozoon malariae as taking place through the

agency of a particular species of mosquito, the *Anopheles claviger*. The recent report of the German commission to Italy on "Malaria," includes, however, the *eulex pipiens*, or grey mosquito of Ross, carrier of (proteosoma or parasite of birds), as being in Tuscany equally with *Anopheles* the host of the germ.

In a very recent paper by Prof. Koch, on "Malarial Parasites" the life history of the two species is set forth, and as being largely confirmatory of previous work by Dr. McCallum, of Toronto, and Major Ross is of special interest.

Summarized it is as follows as regards both *Halteridium* and *Proteosoma* :

1. Young parasite—composed of achromatin nucleus, very scanty plasma and no pigment, lives in or on red-blood corpuscles.
2. Adult parasite—chromatin, pigment and relatively considerable increase in plasma.
- From this point development may proceed in two ways.
2. (a) Endogenous (that is in body of principal host, as birds, &c.) by simple division into numerous small particles which commence these cycles afresh, abandoning the pigment of the mother cell.
4. (b) Exogenous—that is in the body of its intermediate host.
1. The mosquito parasite lives in the blood corpuscle and can be differentiated into male and female.
2. Formation of spermatozoon and impregnation of female.
3. Conversion into vermiform bodies which,
4. Pass through the stomach walls and form coccidia-like spheres in which
5. Sickle-like bodies develop,
6. Passage of these into the poison glands and possibly other organs.
7. Infection of principal host.

The experimental work necessary to lead up to the beautiful results of Dr. Major Ross were obtained by him by means of the grey mosquito, infecting sparrows with the proteosoma. After proving the fact of the transmission to sparrows of the disease, he endeavored to work out the life history of the pigment bodies found by him in the walls of the intestine of mosquitoes. He found these *somata* or black bodies occupying spaces in the muscular walls of the stomach. There grow for seven days to such an extent as to seem like a wart on the outer walls of the stomach, and likewise into the body cavity of the insect. There are groups of the full grown pigment bodies called coccidia, which can be made under pressure to burst their body-walls, or will do so in evolution, by the growth of the contents. These consist in certain peculiar bodies called germinal rods, which are very minute, somewhat flattened bodies, and are present in enormous numbers.

They have not very definite locomotive powers, and evidently are by direct passage, and osmosis diffused into the blood current. He found that in this way they are carried to the veneno salivary glands, which consist of a number of plump cells along a branching duct. There is one gland on either side of head or neck; innumerable germinal rods or sickle-shaped bodies were found by him in the cells of these glands, like groups of bacilli.

The long ducts of these glands on being dissected, were found to end in the common trunk in the proboscis of the mosquito. The proboscis runs under the head in the middle line enters the base of one of the stylets or lancets of the proboscis; the central impaired one, called the tongue or epipharynx, traverses its whole length and opens at its extremity in such a manner that the secretion of the gland must be poured into the very bottom of the wound made by the piercing proboscis.

The secretions of the glands are, it is assumed, poured into the wound for the purpose of checking the spasmodic contraction of the torn capillaries of the skin, which would otherwise quickly stay the flow of blood from the wound.

So much then for the immediate cause of malaria.

The reports of the malaria expedition conducted by Major Ross to the west coast of Africa, repeat the statement from different stations, that the *Anopheles*, the mosquito of pools, wherein vegetable matter is present in abundance, and not the domestic mosquito of the water barrels, is the carrier of the malaria germ. It has a long proboscis, has a different habit or attitude when at rest, and is marked by its dark spots on the edge of fawn colored or dark, greenish black wings. It bites at night and is often found asleep during the day. In 48 hours after feeding the stomach becomes empty and the eggs are laid. The insect is then ready to feed again, which if the mosquito has been put into a bottle, can be effected by placing the mouth of the bottle on the hand of a man, when the *Anopheles* gorges itself. It voids blood likewise in sucking.

The larvæ further are different forms from those of the common *culex*.

The eggs, too, are different, and when laid attach themselves to objects floating on the water pools, and hatch in 24 hours.

## CONSUMPTION IN ONTARIO AND THE RELATIONS OF THE MEDICAL PROFESSION THERETO.

By P. H. BRYCE, M.A., M.D.

July 12th, 1899.

*Mr. Chairman and Members of the Huron Medical Association :*

GENTLEMEN,—It is with much pleasure that I have accepted the invitation of your Association to discuss for a brief time a subject, which of all medical questions is to-day occupying in the largest degree the interest of the medical world, and indeed of society at large.

In the great communities of the temperate climates of both continents the attention of society is being directed to the causes underlying the prevalence of this generally disseminated disease, and perhaps at the present moment yet more to the means of its prevention and cure. When it is realized that even in our own comparatively thinly settled Province this disease caused in 1897 over 11 per cent. of all deaths or 1.4 in every 1,000 deaths, it is evident that no subject can more properly engage the attention of a society whose aims are so wholly devoted to the amelioration of the suffering of their fellow-citizens and to a widening of our knowledge of those scientific problems which occupy the attention of the medical profession of this country.

The interest which the study of this disease has for us as medical men becomes increasingly great when we recognize how numerous are its varied manifestations, how insidious its beginnings, and yet, though so often slow its evolution, so fatally persistent in its progress. From birth to old age this disease is present, often obscuring as mists of the morning our vision in the diagnosis of the diseases of infancy, again seeming for the few short years of childhood to be dissipated as the clouds at noonday, only to return once more with adolescence as a dark storm cloud, too often bringing rapid ruin and destruction with it; or if such be delayed, then only to leave constitutions as shattered ships, gradually but surely breaking up until they finally disappear in the deeper gloom. So generally spread, indeed, are the germs of this disease that the physician must ever be prepared to see them taking advantage of the invasion of every acute disease, as when in typhoid, pneumonia or pleurisy they make the attack at some vulnerable point when the vital resistance of the patient is at its lowest point. Living as we do in a country having no large centres of population, those conditions which fully illustrate all the protean phases of the disease do not greatly exist, yet by reference to the mortality returns of Huron we can find abundant materials for our serious and profitable consideration. I have examined the returns for 1898 for Huron and find that 72 deaths are returned as due to consumption or tuberculosis, arranged according to ages and sexes as follows :

### *Deaths from tuberculosis in Huron county in 1898.*

Sex.	Under 5.	5-9.	10-14.	15-19.	20-24.	25-29.	30-34.	35-39.	40-44.	45-49.	50-59.	60-70.	Total.
Male.....	1	..	1	3	5	..	3	2	3	1	3	4	26
Female.....	2	1	3	6	10	7	4	5	3	..	3	2	46

The first notable fact we learn from these figures is the great disproportion between the deaths of males and of females, there being almost two of the latter to one of the former. The figures as to ages are perhaps too few to generalize from, yet it will be noticed that the preponderance of females beginning in the 10-14 year period is maintained until child-bearing has practically ceased or up to forty years. Making, however, due allowance for the fact that, as in many other parts of the Province, there is the tendency of the young men to migrate to other parts, it must be apparent that some potent forces are operative to make a difference between the male and female deaths from 10 to 40 years vary as 14 to 35. We shall refer to this again. Another interesting table grows out of these returns, viz, that showing the duration of the disease. It must be regretted that this particular is not more complete and accurate, since we find the following :

1	death	at 23 years,	after 4 days' illness.
1	"	10 months,	" 3 weeks' "
1	"	14 years,	" 1 " "
1	"	36 " "	" 3 " "
1	"	62 " "	" a few weeks' illness.

Again, of deaths stated to be due to illness under one year we have one after two months, three after three months, one after four months, one after five months, five after six months, two after seven months, two after eight months, two after nine months, and three after eleven months. Thirteen returns are made giving no data as to length of illness. Of the deaths where the illness is given as over one year I have taken the year periods, neglecting the odd months, and find fifteen over one year, eleven over two years, four over three years, one over four years, three over five years, and one over seven years. The total of those over one year give an average length of illness of two and one-seventh years; or including those exceeding one month up to eleven months with an average sickness of seven months. There were fifty-five deaths with an average illness of one year and seven months. We thus have then in the 747 total deaths which occurred in the county in 1898, 72 or 10 per cent. due to this disease. It will be noticed that the percentage is 1 per cent. lower than the average for the whole Province. While it is incidentally some satisfaction to know that the county of Huron, and indeed the whole northwest peninsula, has for years shown a relatively low mortality from this disease compared with some of the less elevated counties in the Province,—with their heavy clay soils and poorer surface drainage,—yet it will be generally conceded that 72 deaths in a population of 70,000 persons demands our serious attention.

*Its presence in the same family.*—Some years ago I endeavored to estimate from our mortality returns, through taking the names of all persons dying from this disease in a community during a ten-year period, what proportion those names which were repeated bore to the total deaths, and took three old settled counties, Prince Edward, Welland and Lincoln, for the purpose, and with the following results:—

Deaths from consumption in eleven years in three counties, Welland, Lincoln and Prince Edward, total deaths, 1,184; total names, 813; percentage of all names repeated, thirty-seven; average number of times each name was repeated, 2.6.

For our present study I have had the same return made for Huron for the years 1889 to 1898.

The total deaths from tuberculosis in Huron from 1889-1898.....	633.
Total family names occurring more than once.....	115, or 18.1%.
Total persons dying whose names occurred more than once .....	208, or 33% of whole.
Total average of times repeated names occurred .....	2.6 times.
Family names repeated—	
60 names .....	twice.
25 " .....	three times.
10 " .....	four "
2 " .....	five "
6 " .....	six "
1 " .....	eight "
1 " .....	nine "

It seems then perfectly plain that we have here on a broad basis the fact proven, which in isolated instances must have been observed by every practitioner present, that consumption is, if not a disease of certain families, at any rate a disease of particular houses; and until the zymotic character of it as a disease had been demonstrated by Prof. Koch led the profession to suppose that it was in a peculiar sense hereditary. On this point Prof. G. Sims Woodhead, of the Royal Research Laboratory of London, has recently remarked: "I am thoroughly convinced that there can be no tubercle without the presence of the tubercle bacillus, and that in every case the disease is transmitted through the agency of this bacillus. . . . That being the case, I am firmly of the opinion that heredity, using the term in the sense in which it is ordinarily used, can account for very few—in fact for practically none—of the cases of tuberculosis that occur either in the human subject or in animals. . . . Prof. Bang's experiments in Copenhagen certainly afforded conclusive evidence that tuberculosis (in cattle) was not hereditary, children did not inherit tuberculosis from their parents, though they might undoubtedly inherit that weakness of constitution and tissues which constitutes 'predisposition' and renders them peculiarly liable to harbor and nourish the parasites which in the parents had done such damage."

How constant the danger to such "predisposed" children infection may become when the disease is widespread may be gathered from the statistics of a single crowded ward in New York city, where it was found on actual inspection that of the 663 houses in the ward 37% had present one or more cases of consumption, or there were .81% of cases for every house in the ward. With the average duration of each of such cases



extending over an average of eighteen months in filthy, crowded and badly ventilated houses, we can readily understand how great must become the danger and how intense the infection, when it is estimated that the sputa from a single case contain as high, according to estimation, as 10,000,000 bacilli in a single day.

*The Diagnosis of Tuberculosis.*—Having illustrated the general prevalence of tuberculosis in the community, its zymotic and communicable character, and the conditions under which it most commonly invades the system, it is of the first importance that physicians realize these facts in order that they may be in a position to take such measures as are best calculated to prevent the progress of the disease in the individual attacked, and its dissemination especially to other members of his family.

Until within very recent years it may be said that the disease was but seldom diagnosed until the physical signs were well advanced. Thus Dr. S. Edwin Solly, of Colorado Springs, who has written largely from experience in the treatment of the disease in the high climate of the Rockies, gives the following table of 100 successive cases. He found :

In 48 cases treated as soon as diagnosed.....	24 were in the first stage.
	14 " second stage.
	14 " third stage.
In 52 cases not treated for several months or even years after onset.....	14 were in the first stage.
	17 " second stage.
	21 " third stage.

Under the conditions by which sanatorium treatment of the working-classes in Germany is conducted in connection with the Workmen's Insurance Laws, Dr. Gebbard, of the Hanseatic Insurance Co., reports that of 1,541 cases treated during 1893 to 1897, 30.9% were slightly affected, while of 300 cases treated at the Halila Sanatorium in Finland 60% were in the second stage. It will thus be apparent that it is especially to the interest of the German insurance companies to send patients at the earliest stages to sanatoria for treatment and that as a result 30% were treated when slightly affected, and that of the 1,541 cases.

Full working capacity took place in	71.8 per cent. of the cases.
General improvement	85.5 " "
Local " "	58.1 " "

Or taking the figures of the Bremen Insurance Society in 1896, of 297 patients treated at the Richburg Sanatorium,

23.9 per cent.	were slightly affected.
32.7 " "	moderately affected.
43.6 " "	seriously affected.

It is very noticeable therefore, that in recent years, showing how curability of the disease in its early stages has been fully realized, early diagnosis is becoming necessarily more frequent. As we are aware the only one method which, apart from physical diagnosis, has been made use of to any extent with us is the microscopic examination of the sputum, and this as yet I am afraid to only a limited degree. You are aware that for several years the Provincial Board of Health Laboratory has been examining all specimens, properly packed, free when sent through the local boards of health. Doubtless there are physicians who do their own work ; but it must be confessed that up to the present, exact diagnosis of cases of tuberculosis is still very partial with us. That great interest, however, is being shown in this matter may be gathered from the last quarterly report to the Board by Dr. J. J. Mackenzie, its bacteriologist.

He examined during the quarter 218 specimens of sputum, with which 138 history cards were sent. He states that the number is probably too small, and the work too new to base any very definite conclusion upon.

The following were his results of 138 specimens—57 were positive and 81 negative. The cards gave the following information :

	Positive.	Negative.
Under 10 years, 2 specimens .....	50 per cent.	50 per cent.
10-20 years, 22 specimens .....	36.3 per cent.	53.7 per cent.
20-30 " 46 " .....	50 " "	50 " "
30-40 " 33 " .....	38.3 " "	66.6 " "
40-50 " 21 " .....	57.1 " "	42.9 " "
Over 50 " 14 " .....	14.2 " "	85.8 " "

**Another question asks for duration of symptoms—**

	Positive.	Negative.
Symptom—One month and under, 18.....	16.6 per cent.	83.4 per cent.
One to two months, 26.....	34.6 "	43.4 "
Two to three months, 14.....	50 "	50 "
Three to six months, 27.....	55.5 "	43.5 "
Six to twelve months, 28.....	46.4 "	58.6 "
One to two years, 8.....	62.5 "	47.5 "
Over two years, 15.....	26.6 "	73.4 "

Another very interesting statistic is gathered from answers to the question as to a history of infection. All did not answer this question; but of those answering, 34.4% of the positive cases, gave a history of infection, while in those specimens when the bacilli were not found, only 7.4 gave a history of positive exposure.

To the practising physician these figures are of very great value and interest. For instance, a patient comes to him complaining of general debility, often a slight cough, perhaps of a catarrh of the respiratory passages. He very properly fears and looks for tuberculous infection, and failing with his physical diagnosis, sends some of the mucus discharged. We have been told that under three months, less than 50 per cent. have not given positive evidence of tubercle. What is to be the conclusion and action of the physician? Clearly it is not to conclude that tubercle is not present, since as a matter of fact the tubercle may be in the sub-mucous coat, and no bacilli able to reach the sputum, until at a more advanced stage. At this stage, Trudeau, Bowditch and others have occasionally made a crucial test of injection with tuberculin, which has proved so marvellously accurate in bovine tuberculosis, with the result that a rise of temperature has indicated the presence of tubercle, otherwise impossible of demonstration. The Roentgen rays are proving too in some instances of practical utility, by indicating through altered lung expansion, tuberculous deposits in the pneumonic pleura.

It is further most interesting to learn from recent experimentation how frequently the pharyngeal mucous membrane is the seat of tubercular deposit, and how numerous are the cases where the tonsils seem to have been the channels whereby the bacillus has found entrance to the cervical lymphatics. Thus:

Regarding inoculation with the bacillus tuberculosis, Dr. Hugh Walsham, of London, England, in a remarkable paper giving the results of his pathological investigations, quotes Dr. Sims Woodhead, who says: "I am driven to the conclusion that this method of infection of the glands of the neck through the tonsils must be of a comparatively frequent occurrence, especially in children living under insanitary conditions and subjected to various devitalizing influences", and proceeds to cite the experiments of M. Dieulafoy, before the Academy of Medicine, Paris, who obtained a number of portions of tonsils and adenoid vegetations, removed on account of hypertrophy. With material taken from twenty-one cases of hypertrophied tonsils and inoculated into guinea pigs, eight became tuberculized; and of adenoid vegetations from thirty-five cases, seven guinea pigs became tuberculized. As objections were made that the bacillus might be in mucus and not in the tonsil, Dr. Walsham made sections of tonsils from persons who had died in the hospital, in most cases from tuberculosis, but had not apparently suffered from tonsillar tuberculosis. Microscopic examinations showed that twenty out of thirty four cases had tubercular tonsils. While not finding tubercles in portions of hypertrophied tonsils removed from living persons, he quotes Dr. M. Lennoyez to show that tubercular adenoids and tonsils do exist, and that general infection has at times resulted, owing to the wound made by their removal. He concludes:

First. That the tonsils are very frequently affected.

Second. That tubercle may be primary in the tonsil.

Third. That they are frequently affected secondarily in pulmonary cases.

Fourth. That the cervical lymphatics are frequently affected through them.

Fifth. That the tonsils may be affected from without or through the blood stream alone.

Such then are some of the principal results of modern medical progress in placing the practitioner in a position to deal effectively with the disease, which, till very recently, were wholly wanting. Formerly the careful observer might trace, it is true, such general symptoms as would lead him to suspect the presence of the tubercle, and to take steps to

promote general nutrition ; but the very uncertainty of his position necessarily prevented any comprehensive or positive action.

*Measures for dealing with early cases.*—I have indicated the means by which we are now enabled to arrive at a positive knowledge in every suspected case of tuberculous infection ; and assuming that the physician has done all his duty in determining the position in any particular case, we may enquire what line of action may best be pursued to obtain the best results. And the first point which arises is one so difficult of determination that I have little doubt but that the gentlemen present may hold different opinions regarding it. We are all aware how the word consumption mentioned to a patient has in the past seemed almost equivalent to telling him that he has been condemned to death. If it were true that the sentence were to be executed in a very short time, I presume all would agree, at any rate in theory, that it is proper to tell a patient the fact in order that he might arrange his affairs accordingly. But we have seen from the statistics of Huron county of even a single year, that the disease from the period at which it was diagnosed lasts an average of at least eighteen months ; and from other statistics, as well as from our personal experience, we know that cases may last several or even many years. It is further true that conscientious physicians have found that to tell a patient that he was affected with tuberculosis has resulted in the patient or his friends being so averse to believing such a possibility that they have gone for advice to another physician, who, less honest or capable, has pooch-pooched the idea, set down the first as an alarmist or incapable, and succeeds for the time-being in securing a new patient, and by tonic treatment seemingly making good his position. After such experiences, physicians will conclude that pursuing a Fabian policy is probably most in keeping with his own interests if not those of his patient. Personally I am fully convinced that from the standpoint of the individual interests of the physician, such action is not only wrong, as well as being morally inexcusable, provided that he shall have had such experience of men as to be able to state the position so carefully as to cope successfully with the individual idiosyncrasies of his patients.

Dr. Solly, of Colorado Springs, in a chapter on—"The Individual in Climatotherapy," discusses the influence which the conduct and temperament of the consumptive exerts upon the progress of the disease. He says, "That looking over the original notes of 141 cases, and recalling mental pictures of each individual and his surroundings, I find it comparatively easy to range them under the several temperaments of Hellwig's Table—

Temperament	Receptivity	Reaction
Chlorotic	Strong	Strong
Sanguineous	Strong	Feeble
Melancholic	Feeble	Strong
Lymphatic	Feeble	Feeble.

By the terms receptivity and reaction, he simply means that degree of nerve force in the individual which measures "his capacity to receive an impression from, and his power to react to his environment. Such a receptiveness may be termed as "nervous," as opposed to phlegmatic temperaments. Corresponding reaction when strong, would be "sanguineness", when slow, "lymphatic". Such distinctions are all recognized as having a practical interest, for us in disease, since they indicate for us certain phenomena as variations of pulse, temperature, etc. I am positive however, that in this matter of the individual, we need assign as regards treatment and prognosis, at least as great or even greater importance to the matter of education, self control and moral qualities in the patient. Indeed Solly devotes a section to this question of wisdom and unwisdom. Going carefully over his 141 cases, he found 61 per cent were wise, and 39 per cent unwise. Comparing these results with the table of temperament, he notes that the greatest amount of wisdom was among those of a phlegmatic temperament, and strong physique. Turning to his table of cures he points out that in cases in all three stages of the disease the percentage of cures in the wise was one third more than the average, and nearly four times as many as in the unwise ; while a similar difference prevailed in the cases in the first stage.

I have referred to these somewhat unusual statistics and the remarks on them because I deem it as of prime importance for the physician in setting out on the campaign for successfully dealing with cases of chronic disease to accurately estimate the value o

the various obstacles to be overcome, and the amount and quality of weapons at his command. I am fully aware of the many practical difficulties which in everyday practice the physician finds not only laying down a definite line of occupation and regime in the life of his various patients, but it is our duty not only to appreciate the end we are aiming at but to make the patient our confidant, thereby obtaining as far as possible his confidence and his ready willingness to enter into the struggle against his disease with his physician. Assuming both these points gained, the physician has the further practical problems to deal with, such as the location of the residence, its construction as regards drainage, lighting and ventilation, and the social position of the patient. He may be young and dependent upon others, or he may be the head of a household dependent upon him for support. Now I am not prepared to say that the physician in routine practice is in duty bound to become in all these matters the tutelary deity of all his patients, although I am convinced that many do become practically that to many families; but speaking from the standpoint of successful results in dealing with a disease so dependent upon nutrition as tuberculosis is, I would say that our own experience as well as the experience of all the great physicians of the world who have dealt with this disease, teaches us that we have no alternative but to become this to every patient if we are to keep him under our treatment. The conclusions of the three great congresses of Paris, Moscow and Berlin have all been the same, and are summed up in the brief axiom, "*Fresh air and the regulation of the patient's life*."

It becomes apparent therefore to us, whether as individual practitioners, members of a county association, or of the body politic, that assuming on the basis of last year's mortality returns the existence of 150 cases of tuberculosis under treatment in the county to-day, we have to solve the problem of curing these under social conditions similar to those which have existed during past years,—which means that we really enter upon the problem of regulating the daily life of probably 150 homes,—or else we have to adopt some other plan whereby we can practically gather all these patients into one or more schools, sanatoria, homes, or whatever you like to call them, and to there regulate for a time their lives and by example and practice inculcate in them such habits of personal hygiene as will enable them to return to their former or perhaps some more sanitary occupation to complete their recovery while at the same time earning a livelihood. We are all aware how far the evolution of hospitals has gone on in the Province, there being one or more in the towns and cities of almost every county; and we fully recognize that with regard to the poor and indeed others suffering from particular diseases that medical treatment can operate with greater advantage in these because of the facilities therein supplied. The abuses that have crept in along with the development of hospitals are not to be compared to the advantages due to the hospitals themselves.

*The Problem of Sanatoria or Homes for Consumptives.*—If the facts already set forth are such as will be accepted by us as medical practitioners it would appear, that as a County Association we may very properly advance another step in attempting to deal with that problem of problems, the treatment of tuberculosis, with a view first to the care of those infected, and second with a view to lessening its future prevalence.

I have already referred to some statistics obtained from German sanatoria, which have had under treatment persons sent to them by the Society or Companies who insure all work-people who, not receiving a greater daily wage than \$1.50, are required by law to be insured. The law provides that for a certain percentage of their wages paid over to the Insurance Companies they become entitled to treatment and half-pay for an average of thirteen weeks.

As a very noticeable percentage of the insured sick suffered from tuberculosis, which formerly ran its ordinary course, the company having to further pay the death claim; it soon became apparent that there was nothing which so lessened profits as deaths from consumption. Some four years ago the experiment was made of sending sick workmen to sanatoria, the insurance company arranging for the scale of fees, which has averaged from \$4.00 to \$5.00 per week. The experiment from the first proved so successful that in 1898 societies and municipalities were spending nearly \$1,000,000 for buildings alone as sanatoria, the object being to get the insured into these at the earliest moment possible in order that a cure might be effected, and that if not cured entirely the company would by restoring their ability to labor delay the period when a death claim would have to be paid.

Dr. Gebbard of the Hanseatic Insurance Co. has made the statement from actual calculation that it would pay the company to establish a sanatorium if out of 450 patients 150 could have their lives continued so that they would be enabled to continue at work one year longer than otherwise. The importance of the statement may be estimated from the fact that the cost of sickness in the different societies in Germany was in 1891 \$21,312,610.00. There were 21,498 associations and the cost of medicine and medical attendance was \$7,399,155.00. If then such an evolution of systematic methods for the treatment of consumption has taken place in so short a time, it would appear beyond question that there are undoubted advantages attaching to it. Dr. Walters, a prominent London physician, has just given us in a large published volume the latest information regarding sanatoria for consumptives, situated in every part of the world. In his chapter on "The Fresh Air Treatment" he says:—"An open air life is the key-note of sanatorium treatment. The patient, instead of being kept in a warmed room, ventilated from other parts of the house, according to the popular notions of old, lives in the open air from morning till night in all seasons and in all weathers. Lack of fresh air is the predisposing cause of consumption; fresh air is the most potent means of restoring him to health." Shelters against wind, excessive cold, extreme heat and rain are provided. Attached to such sanatoria quite large grounds, preferably sheltered by forests of evergreen, are a desideratum. Walks, with shelters and resting stations at short distances, are provided, with gentle inclines, verandahs, and covered corridors with glass windows on exposed sides are likewise provided. On these the *rest cure* for those with fever are carried on, the patient being wrapped in flannels and furs and reclines on chairs for the purpose, and is provided in cold weather with foot warmers. The heart is rested in this way, and the blood of course flows more easily to the apices of the lungs. Evening air is found not to be injurious to those inured to this out-door life. In many German sanatoria a simple system of hydrotherapy is practiced.

All this may seem simple and readily carried out, but experience and observation have shown that close and systematic medical supervision of every patient is necessary if good results are to be obtained. Patients who are febrile must be kept at rest; if persistently so, they are best in bed and their cots are wheeled on to the verandahs, thereby improving the appetite and improving the circulation. As the patient improves, exercise in the shape of passive motion is given, with massage, and resisted movements with the patient still in the recumbent position. This is followed by gentle walks a few yards and then a rest, and increased from day to day as experience dictates. Great care is exercised to prevent over-exertion, and the patient must not exert himself till he gets out of breath. A brisk frictioning with a little food after their walk is practised, while half an hour of rest should be taken before and after every important meal. Sedentary occupations which contract the chest are forbidden, but every encouragement is given to occupations, keeping the mind healthy. Gentle games for the stronger patients are practised, croquet in summer, gentle cycling, and sledging in winter are encouraged, especially those tending to deepen the inspiration and carry the air into every portion of the lung tissue.

The balance of the treatment is especially directed to the feeding of the patients, good plain mixed dietaries such as the well enjoy are the principal foods; and the amount of foods given does not notably exceed that in health. Easily digestible foods, rich in nitrogen and fats, such as milk, cream and butter, figure largely in the dietaries. Cod liver oil, much encouraged in English practice, is but little used at continental sanatoria. Medicines are not used except to deal with any special emergency which may arise, especially such as may improve that most difficult symptom,—dyspepsia. Alcohol is recommended by some; is wholly discouraged by others; and on the whole practice seems increasingly against its use in a dietary. Prolonged stay until the progress has gone on to a cure is manifestly necessary if permanent satisfactory results are to be looked for; and the more exact physicians do not consider a return to every-day occupations until repeated tests have shown the expectorations to be free from bacilli.

*How to Establish Sanatoria in Ontario.* I have briefly summed up the treatment which is practiced in sanatoria everywhere, and indicated some of the reasons why such are a practical necessity in Ontario if we are to look for success in dealing with cases of consumption. The problem remains to be solved, how shall we establish them. Experience on the Continent would seem to indicate that not more than 100 patients should be

congregated in a single sanatorium. Density of population means infection of the air ; while a certain number together are necessary for a fair degree of economy in management. I have already shown from statistics that there are probably from 150 to 200 persons affected with tuberculosis at the present moment in Huron county, and assuming that 50 per cent. of these are suited for sanatorium treatment,—that is, in a probably curable stage,—it means that, as during the past twenty years we have seen poor-houses established in most of the older and more populous counties by the county councils, assisted by the Government, so with much more reason we may go to them to assist in this work of establishing a county sanatorium

1st. Because many lives depend upon their action.

2nd. Because these lives are most largely of those in the earning period of life, as shown by our statistics, and therefore of most direct value to the country.

3rd. Because of the very general failure of home treatment in effecting a cure in this disease.

4th. Because of the enormous cost involved in the long sickness, nursing, and other necessary attendance.

5th. And lastly the great danger which the ordinary methods of home treatment necessarily have for other members of the family, and which have been unfortunately too well illustrated in the ten years' statistics of deaths already referred to.

Remembering that the patients going early to sanatoria will seldom be without means to pay at least part of the cost of residence and treatment, and thus be in a wholly different position, as regards cost, to that of the industrial home, we need not as a medical association hesitate to take united action in demanding that such a sanatorium be established in the county. The list of family names, in all, taken from the death returns of Huron, tell only too truly how the personal factor enters into the question with almost every citizen. Who has not some friend suffering from the disease ; and who does not long for some means by which their own dear ones may have an opportunity of escaping the inevitable fate which has hitherto been attached to the disease ? Were this association to go as a body to their representatives the matter could be determined in a single year. And I shall be pleased indeed to think that what I have said this afternoon may have been of some assistance toward so desirable an end.

## REPORT ON THE BERLIN SEWAGE FARM.

BY THE SECRETARY.

July 14th, 1899.

*To the Chairman and Board of Sewage Commissioners.*

DEAR SIR,—As promised, I beg to send you a brief report on my inspection of the sewage disposal works of Berlin, in consequence of complaints by the authorities of Waterloo Township, of effluvium nuisances and stream pollution arising therefrom.

The works instituted some 9 years ago have served a notable purpose and been of great benefit to the city of Berlin.

The splendid water supply and very wide extension of the sewerage system in Berlin have played a most important part in the commercial progress of the town ; and when it is remembered that with the small stream as an outlet, the city has been able to dispose of nearly 1,000,000 gallons of sewage daily, without involving itself in legal trouble with the neighboring municipality it must be considered that the small cost, both of the original construction of the sewage farm and for its annual maintenance afford much reason for satisfaction.

Two permanent factors, however exist, making it apparent that the town can never look upon its expenditures, either in dealing with its waterworks or sewerage works as a finality, viz. : the increase of population, and the constant extension of the use by the people of both public water and public sewers. This being the case, it is apparent that so far as the sewage disposal works are concerned, your committee has always to be considering,—

1st. The extension of the sewage farm, and

2nd. The making the present farm do the largest amount of possible work, compatible with freedom from effluvia nuisances from the beds and adequate filtration of the sewage.

Although at the time of my inspection on the 4th of July last, there was no serious effluvia nuisance noticeable in the afternoon, and while the discharge from the effluent tiles was clear, yet there existed in the large beds covered with sewage undergoing decomposition, a condition, which must under favorable conditions promote effluvia nuisance, and therefore give cause for complaints. Of course this may be to some extent, inevitable with all methods of sewage disposal, as with manure heaps, their distribution on land and in industries such as tanneries, gas factories, fat-rendering, etc.

The matter therefore, is one which your Board will be expected to give special attention to, so that all reasonable causes of complaint may be removed.

To this end therefore, it will be necessary for the local board of health and sewage committee of the council, to consider the following points :—

1st. The institution of means by which,

(a) All matters such as chemicals which may be germicidal, are removed by private persons before the sewage from these premises is allowed to pass into the town sewers.

(b) The construction of a receiving tank of such capacity that the sewage may be deposited therein with all suspended matters, which will remain there until made soluble by decomposition, and from which only sewage in solution will go to the beds. I am convinced that effluvia which may at present arise from the beds are due notably to such solid matter putrefying on edges of ditches, beds, etc.

Such a tank might be very economically constructed at the sewage farm along the outlet sewer, and of a capacity to hold say, 6 hours sewage. Such should be divided into two compartments for convenience, and should be covered and ventilated.

(c) The beds should all be brought to a true level for purposes of cultivation, and even irrigation. If cultivation of crops on the beds were made systematic, care would be taken that only as much sewage in solution would be applied on each as would not stand and become stagnant, while regular working by cultivation would enable the ground to treat more than by present methods. The cultivation of beet-root seems peculiarly suitable on such soils as that of the Berlin Farm.

(d) Such disposal of the sewage, means the addition of more land to the Farm, and probably also the preparation of an area where the surface sewage can be purified on a rapid filter bed of either sand, coke or cinders, and of an extent adequate for the increasing needs of the case.

(e) That under the committee the whole Farm be put under the direct management of the town engineer, so that plans, surveys, estimates, returns of crops, costs and methods, can be made and preserved ; and that thus from year to year the town and all interested would be able to know exactly just what the Farm has accomplished, and by what special methods.

I am,

Yours very truly,

P. H. BRYOE,  
Secretary Provincial Board of Health.

## REPORT ON THE PROPOSED SCHEME OF WATER WORKS AND SEWERS FOR SMITH'S FALLS.

BY THE COMMITTEE ON WATER SUPPLIES.

Toronto, July 14th, 1899.

MR. CHAIRMAN AND GENTLEMEN,—From the correspondence submitted, together with the plans prepared by Mr. Willis Chipman, C.E., it will appear that Smith's Falls is realizing the need for sanitary progress.

The proposition before the people at present, is to purchase the existing waterworks of Mr. Foster, and to extend them throughout the town.

The water is at present taken from the flume of Mr. Foster's dam which is fed by water from the escape weir of the Rideau canal, at this point.

The water has proved satisfactory for some years to those using it; but owing to its being drawn at a point in the Rideau, below a very considerable area of what was once drowned land, the question has arisen as to the advisability of using the river as a public supply. The problem is an important one, since the town is located on limestone rock, at places on the surface; and wells, bored into the fissured rock, have been shown in many instances to be polluted.

It may be further said that no other source than the Rideau within miles is available for a public supply. In company with the mayor, your secretary went up the river above the town for several miles to the next lock, where the channel is cut through the Laurentian rock. Here the stream is clear, flowing rapidly. Above this, again however, is a wide area of drowned lands, with the remains of tree stumps. Algid growths are seen in the shallow areas amongst them.

The river or canal is, however, a large stream receiving a large amount of water from the great and lesser Rideau lakes; two beautiful expanses of water, over which your secretary returned to Kingston the succeeding day. There are no towns on the lakes, which may be considered as large settling basins for the small amount of sewage from Perth, some 25 miles away on the river Tay.

In the reach between the town and the first lock above, the low drowned area has a rank growth of river grass, but the main stream flows swiftly to the lock and falls at the town. Some boat-houses are along the stream above the locks, and a few houses on streets close by. There are no sewers from these and no present evidences of sewage pollution are seen.

With a view to determining the character of the water, samples for chemical and bacteriological analysis were taken from the tap, the flume, the river several hundred yards above the locks and above all buildings, and at the locks three miles above.

The following is the report of the analysis by Dr. W. H. Ellis:—

	Tap.	Flume.	Upper Lock.	River above Town.
	I.	II.	III.	IV.
Chlorine .....	0.5	1.0	0.5	0.5
Free Ammonia .....	0.12	0.2	0.2	Trace.
Albumenoid Ammonia....	0.28	0.33	0.28	0.4
Hardness .....	2°	6°	6.5	6°
Bacteria, per c. c. ....	676	580	106	210

The analyses, allowing for the incidental variations in the bacteria due to the position of the flume and the agitation of the water at the falls, in samples one and two show the water throughout the whole area to be of essentially the same character, except that the strong agitation gives the water in the flume rather more albumenoid ammonia, which shows a further increase in the sample taken above the town, where the great river grass areas are on either side. The sample three miles above is essentially the same in character with the tap water.

On the receipt of these analyses, your secretary communicated with the town authorities, copy of which is herewith submitted.

Remembering the facts set forth and the great use there is for the town installing a general water works plant, it is recommended that this Board approves of water taken from the Rideau at any of the several points referred to, which may be approved by the engineer subject to the provisions:

1st. That the town take action when necessary, under the powers given under the Public Health Act and Water Works Act, to prevent any pollution of the river at any point above the intake, which might in any way endanger its wholesomeness.

2nd. That in order that the best results be obtained, a mechanical filter of approved character be installed, in order that any excess of vegetable matter, especially in the autumn, winter and spring months, be prevented.

All of which is submitted respectfully,

(Signed) P. H. BRYCE,  
Secretary.



## INSPECTION OF MUSKOKA HEALTH RESORTS.

By P. H. BRYCE, M.A., M.D.

Toronto, May 31st, 1899.

*To the Chairman and Members of the Provincial Board of Health :*

GENTLEMEN,—I beg to report that owing to the large interests, both health and commercial, associated with the sanitary conditions of the health resort accommodation of the Province, I have endeavored to visit as many of the resorts in the Muskoka district this year as possible early in the season, in order that it might be practicable to have put into operation any improvements deemed necessary before the tourist season begins.

The following circular was issued, and has been well responded to indeed :

TORONTO, April 4th, 1899.

DEAR SIR,—In view of the approach of the Tourist Season, and of the increasing interest the transportation companies are taking in our Northern Health Resorts, this Board is anxious that by every means such resorts be made both attractive and safe to the health of the summer visitors. With a view to encouraging all keepers of Hotels and Boarding Houses to improve their accommodations, and to make better their water supplies and their methods of sewage disposal, it is my intention to visit during next May and later months, such of those as I find it possible to reach, and thereafter to use discretion in publishing for the benefit of the public, a list of places approved of or otherwise. I send you a pamphlet issued by the Board dealing with these matters, and request you to send as early as possible answers to the following questions :

1. Do you keep rooms for the convenience of the public, either as hotel or boarding house?
2. If so, how many rooms are there in your house, and state the number of persons for which you have boarding accommodation?
3. Have you a supply of ice laid in for the summer?
4. What is your water supply? (a) If from well, how is the well located as related to local sources of pollution? (b) If from lake, state how water is taken, whether by wind-mill or other pump, and at what depth and distance from shore?
5. What is the method of disposal? Giving details of (a) Excreta, (b) of house-slops, (c) of kitchen refuse.
6. How many storeys has your building? If an hotel, what are the fire-escape methods from second and third storey windows?
7. What acreage of land is attached to the premises proper?

Give such further details regarding your accommodation as will enable me to form an accurate estimate of your facilities for accommodating the public.

It is not intended that this information will be published, and is being collected only for the use of this Department in its desire to aid our resorts, while at the same time helping to protect the public.

Hoping to receive an early reply,

I am,

Yours truly,

PETER H. BRYCE,

*Secretary Provincial Board of Health.*

The information supplied gives an accurate idea of the extent of the room accommodation in the hotels and boarding houses of the district which have reported. It was not considered necessary to send the same circular to the hundreds of cottagers of the lakes, since last year the circular, of which the following is a copy, was sent to each, informing all of the law regarding the pollution of streams, and asking the co-operation of all towards keeping the district in the most perfect state of sanitation possible :

TORONTO, July 12th, 1898.

DEAR SIR :

With a view to maintaining the deservedly high reputation of the Muskoka Lakes District as a Health Resort, the Provincial Board of Health desires to draw the attention of all residents on its lakes and rivers to the Public Health laws relating to the pollution of streams. Sections from the Public Health Act are appended to this circular.

Apart from the purely sanitary question of preventing any excretal or sewage pollution of these lakes and rivers, where their waters may be the means of disseminating typhoid fever and similar diseases, if used as they generally are as the source of the domestic water supply, there is the further aesthetic sense which must be satisfied if the celebrity which the District already enjoys is to be maintained.

When nature has done so much it is not proper that any neglect in sanitary matters should be allowed to lessen or neutralize the advantages and benefits arising from its gifts.

Inasmuch, therefore, as here and there individual instances of pollution of these lakes and rivers are known to exist, the Provincial Board of Health has desired that this circular reach every householder, resident in the District, to inform them that under the powers to prevent and abate nuisances laid upon it under The Public Health Act of Ontario, it will take such steps as may be found necessary to prevent the pollution by any person of the waters of the Muskoka lakes and rivers, and to abate all nuisances or insanitary conditions arising therefrom in all cases coming to its knowledge whether by inspection or complaint, where the Local Board of the municipality has already failed to take action. It is, therefore, requested and expected that all owners or tenants of hotels, boarding houses, cottages or other dwellings, will consult the requirements of the Public Health Act and govern themselves accordingly and aid the Board in this work in every manner possible.

The Provincial Board requests that information regarding unsanitary conditions be forwarded by any aggrieved persons to the Secretary of the Board.

I have the honour to be,

Your obedient servant,

PETER H. BRYCE,  
*Secretary.*

P.S.—Pamphlets descriptive of methods of disposing of house-wastes and sewage may be obtained on application to the Secretary of the Provincial Board of Health, Parliament Buildings, Toronto.

As is generally understood, the accommodation for the public in the Muskoka, and indeed in all our health resorts, consists—

(a) Of what are, or were originally, farm houses, which began by taking, in the crowded season, a few boarders, and which gradually have been enlarged until in a few years the accommodation of tourists has been the chief business, the farming becoming a secondary matter.

With the more successful of these, the original house has been either torn down or largely remodelled, and the several larger and best known summer hotels are capable of accommodating from 150 to 200 guests.

It is natural therefore to expect that we would find, as is indeed the case, the sanitary appliances varying from those of the simplest and crudest character, upward, until in a few, modern plumbing appliances, steam engines to pump water and heat buildings, have been introduced. As the accommodation varies from 10 to 200 guests, it is apparent that the needs from the sanitary standpoint vary in proportion to the number and density of the population.

It has therefore been my object to estimate the actual needs as well as the financial ability to make improvements of each resort visited, and to make such suggestions as would be adequate for each; and I may state that nothing has been more pleasing than the ready acquiescence, I may say in every case, in any suggestions made, in the case of the larger resorts, as the hotels, there has been a real anxiety exhibited that I make some such practical suggestions as would enable them to grapple with the vexed question of sewage disposal.

In no single instance did I find the least desire to persist in the too common methods elsewhere of pouring the sewage into the streams of lakes.

One thing everywhere in Muskoka has been recognized, viz :—that it is not good form, decent or tolerable to pollute the lake. Remembering then that provision has to be made in some cases for dealing with the sewage of 200 persons daily for several months, it will appear no easy task to have some simple yet effective method adopted, where as in several cases, the hotel is simply a house built on a rock.

Remembering how crude after many years are the sanitary conveniences of hotels in all of our non-sewered towns, where our local boards are supposed to have been exerting a steady influence, the efforts which have been made and are yet being made at these Health Resorts, for the comfort and health of their guests during a short summer holiday, are most commendable.

The remark has been made that there is not a first-class hotel north of Barrie, but it is apparent that all depends upon what is called "*first-class*." If by this is meant a four dollar a day hotel and all implied in that, I may say it is to be hoped in the interest of health-seekers, that our northern resorts may never see a first-class hotel. If it means comfort amidst healthy surroundings with reasonable conveniences available, at from one dollar to two dollars per day, then I would say there are a number of *first-class* hotels.

Referring in detail to some of the conditions found, it may be said that in nearly all instances, the brown lake waters are used for all culinary and domestic purposes, except drinking.

In a number of the hotels, spring water is supplied, and with ordinary care on the part of the guests, they can always obtain it. Ice water is also very commonly used.

With however, the care that is being exercised on every hand to prevent pollution of the lake waters, I am convinced both from observation, and for scientific reasons, that these lake waters taken at a depth and in places where the currents keep up free movements, are perfectly wholesome for drinking purposes.

*Disposal of Excreta.* Five hotels in whole or in part have water closets of modern type; while several others are having similar appliances introduced this year. These are :—

Minnewaska—Gravenhurst.

Oox's—at Port Sanfield,

Maplehurst—Rosseau.

Strouds'—Lake Muskoka.

Monteith—Rosseau.

Others under construction this year, are—

Currie's—at Bala.

Fraser's—at Port Cockburn.

In all instances where excreta and kitchen water, etc. have been disposed of by sewers, the disposal has hitherto been into cesspools.

These have so far as pollution of the lake was concerned, been satisfactory; but they have as has been as the case elsewhere presented difficulties regarding the overflow water.

The problem of how to dispose of the sewage in all such cases as of the larger hotels, is not only an urgent but a difficult one, and is made more difficult in individual instances by the character of the location.

The principle which I have in all cases recommended, is essentially that of the septic tank, with an overflow to receiving tank whence final disposal is made to sub-surface tiles, or an artificially made bed in which the principle of final nitrification of the sewage is to be carried out.

The difficulty has been to make the principles involved; clear to the person who is charged with the oversight of the work; and after this we have to assure ourselves that this work done will be satisfactorily carried out. Errors will doubtless be made, but the principle having been adopted, its ultimate success will be assured.

The following table is given from replies sent in to circular, supplemented by my own inspection.

	Rooms.	Water.	Disposal of Excreta.	Fire Escape.
<b>Lake Muskoka, Gravenhurst—</b>				
Minnewaska .....	40 .....	Spring .....	W. C., by sub-surf tiles ..	Verandah.
Robinson's .....	21 .....	Well .....	D. E. and sub-soil for slops ..	Verandah.
Currie's (Bala) .....	50 .....	Bala Falls .....	D. E., Drain sub-surfaces ..	Verandah.
Mortimer's Point .....	25 .....	Lake .....	D. E. (cess-pool) .....	Stairs.
Jackson's (Bala) .....	13 .....	Lake .....	Privy, carried away by drains .....	Verandah.
Clement's (Bala) .....	14 .....	Well .....	Privy .....	Verandah.
Hutton House .....	13 .....	Well .....	D. E. drain .....	Verandah.
<b>Port Carling—</b>				
Buddy's Hotel .....	30 .....	Spring .....	D. E. drain .....	Iron ladders.
Milford Bay (Stroud's) .....	32 .....	Well .....	W. C., cess-pool for slops ..	Ladders.
Hugget's (Bala) .....	10 .....	Well .....	Privy .....	Verandah.
Rosedale (Torrance) .....	5 .....	Well .....	Privy, slops to pigs .....	Verandah.
Board's (Bala) .....	35 .....	Well .....	D. E. .....	Verandah.
Whitides (Sutton's) .....	20 .....	Well .....	D. E., slops carried away ..	Verandah.
Gravenhurst, Fern Glen .....	5 .....	Well .....	Privy .....	Verandah.
<b>Lake Rosseau—</b>				
Monteith's .....	75 .....	Spring by w. power .....	W. C., sub-surface .....	Verandah.
Woodington, Lake Rosseau .....	27 .....	Lake .....	D. E., slop sink .....	Ladder.
Fenndale, " .....	40 .....	Spring .....	D. E., slop sink .....	Spiral stairway.
Cleveland's, " .....	34 .....	Well & W. M. .....	D. E., cesspool slops .....	Verandah.
Windermere, " .....	95 .....	Well .....	W. C. (filter) .....	Verandah and iron ladders.
Fyfe House, " .....	29 .....	Well .....	W. C., and cess pool .....	Iron ladders.
Maplehurst, " .....	45 .....	Well .....	W. C. by drain to cesspool ..	Verandah.
Laurason, " .....	12 .....			
<b>Lake Joseph—</b>				
Hammell's .....	28 .....	Lake .....	D. E., no slop sink .....	Dqrs.
Stanley House (McLeans) .....	55 .....	Lake .....	D. E., tile drain to garden ..	Iron ladders.
Port Sandfield .....	26 .....	Spring .....	D. E., sink for slops .....	Iron ladders.
<b>Georgian Bay—</b>				
Pemetsanguishene .....	150 people .....	Spring .....	Filter beds .....	Stairs.
Belvidere, Parry Sound .....	120 " .....	Lake .....	Daily returned refuse .....	
San Souci, Go Home R. ....	60 " .....			
<b>Lake Muskoka—</b>				
Beaumaris Hotel .....	75 rooms .....	Lake .....	D. E., slops to cesspool ..	Verandah.
<b>Lake Rosseau—</b>				
Port Sandfield .....	200 " .....	Lake .....	D. S. & W. C. ....	Verandah.
Feignton House .....	15 " .....	Lake .....	Privy, slops carried away ..	Verandah.
Marinas House .....	25 " .....	Lake .....	Privy, slops carried away ..	Verandah.
Jud. Haven .....	12 " .....	Well .....	D. E., slops carried away ..	Verandah.
<b>Lake Joseph—</b>				
Craigilea .....	35 " .....	Lake .....	D. E. ....	Verandah.
Gordon House .....	15 " .....	Well .....	D. E., slops to bucket .....	Verandah.
Fraser's Port Coburn .....	200 " .....	Lake .....	W. C. filter .....	Verandah.

I propose as time permits to complete my inquiries, as a few resorts readily reached still remain on the Muskoka Lakes, while a number of those on Georgian Bay are asking for information regarding methods of sewage disposal.

What I think may be said with perfect confidence to the public, is, than nowhere in the areas inspected is there any danger from the water supplies; that very great care is being shown in caring for the household refuse so as to prevent effluvia nuisances, and that remarkable progress is being made in modern methods of sewage disposal in connection with even the smaller resorts of the Muskoka District; while the larger ones may from the present onward, be looked upon when their improvements are completed, as being object lessons to many people who go from our towns, of what may be done in the disposal of sewage by simple methods if scientifically applied.

The general character of these hotels is thus indicated. It would be impossible to tabulate all details, but it may be said that while in the smaller places the house slops are likely to prove a source of aerial nuisance if not regularly disposed of, yet the adoption of the suggestions made of sub-surface disposal from a small septic tank, discharged at intervals, will, it is hoped be of much advantage.

The notes of inspection include these various recommendations, and while the methods adopted, according to the location, will prove varied, yet I am convinced that the general desire shown to make improvements will result in notable advances in the general sanitary condition of all these Resorts. Where conditions were unsatisfactory, it is hoped that the instructions given will prove quite as effective as giving any publicity to defects would do.

The public have so many places to choose from that the business instincts of all caterers for public patronage will prove the best incentive, when all know that comparisons can readily be made. One of the best proofs that this district is, in so far as the pollution of drinking supplies is concerned, in a satisfactory condition, is seen in the fact of the almost complete freedom during the past year from all cases of typhoid fever, the sure index of sewage pollution.

I hope to be able, as the season progresses, to make further inspection of other places, and to ascertain how far the suggested improvements have been carried out.

Reverting to another phase of my inspection, it may be said that I had previously received complaints from the local board of Gravenhurst, as to the fears of the townspeople that infection to them must result from the growing habit of consumptives in advanced stages of the disease going to the boarding houses of the town for a change of air, usually at the request of their physicians.

This difficulty has been the invariable result in other countries whenever any district has become noted for its climatic advantages. Complaints were heard from many persons that consumptives, with their friends, write for accommodation to different boarding-houses, without stating they are in ill-health; and during the past season many obtained rooms in this manner, to the great discomfort of tourists and the detriment of boarding-houses.

Two sessions of the local board and council were held in Gravenhurst, when I was present, during which a series of clauses of a proposed by-law was prepared and discussed for the licensing of all boarding-houses within town, and the setting apart under inspection such as were willing to accommodate consumptives for this purpose only, making such liable to penalties if they entertained other boarders without notification to them of the character of the license held.

Compulsory notification by physicians and householders of all patients and inmates suffering from tuberculosis is a part of the by-law proposed; and the regular inspection and disinfection, with the supplying of spittoons and other necessities, are likewise added. Expectoration by phthisical persons on the sidewalks and in public buildings is likewise to be prohibited under penalty.

The Gravenhurst Sanatorium was inspected, and its progress and success in the work it has undertaken seem assured.

The accommodation has now reached 50 beds, and the results in those cases whose stay has been prolonged have been very encouraging.

All of which is respectfully submitted.

(Signed) P. H. BRYCE, M.D., Secretary.

## REPORT OF THE COMMITTEE OF SCHOOL HYGIENE.

By J. J. CASSIDY, M. D.

November 15th, 1899.

*Mr. Chairman and Gentlemen of the Provincial Board of Health :*

GENTLEMEN,—Owing to the fact that the mere congregating of large numbers of children in our Public Schools exposes some of them to the danger of catching infections from the others, it is most important that medical inspectors should be asked to assist the educational authorities in preventing dangers of this nature.

To be of real service, the work of prevention should be prompt and efficient, because, while the health of the scholars should be maintained at a high level, inconvenience to the teachers and the general public from the closing of the room or even a whole school, is very much to be deprecated. The simplest way to attain this end is for a school board to appoint one or several medical inspectors according to the number of schools in the section. When an inspector enters upon his duties he can easily arrange with the principal of each school as to the hour most suitable for his visit. After the inspector has become acquainted with the children, a short daily examination would be sufficient. He could readily single out those whom it would be necessary to examine minutely. It would not be necessary to make prolonged inspection of each child every day. This of course need not apply to new scholars who would receive a thorough and rigid examination.

The length of the daily inspection would also be determined by the character of any infectious disease which might prevail in the neighborhood. Generally speaking, also, the season would influence the care to be devoted to the work. For instance, in Toronto, the curve for scarlet fever exhibits two maxima, one in April and a second one in November. As the contagion of this disease is particularly active, and as it chiefly affects children of school age a sanitary inspector should be more careful in examining his charges at these times. The Inspector should be a physician, a competent man and one possessed with good executive ability. He should have special fitness for diagnosing the diseases of children, more particularly the infectious and communicable diseases.

The early detection of measles is both important and yet difficult. Important, because this disease is infectious during the three or four days before the eruption appears ; and difficult, because to the unskilled observer, the eruption is its only characteristic sign. It will be too late to prevent the spread of measles in a school if a diagnosis is not made and isolation practised prior to the eruption period.

The diagnosis of diseases of the throat calls for microscopic and microscopic knowledge of the pathology of that part of the body. A scholar with an acute angina, should be viewed with suspicion and isolated until the question of infection in his case can be regarded as settled.

When necessary the bacteriological test should be made, so that diphtheria may be diagnosed at as early a stage as possible. Usually in Toronto, a test tube is supplied to practitioners, which answers the purpose very well. The tube contains a swab prepared from a piece of wire around which a bit of cotton is wrapped, and the tube is plugged with cotton. When a child's throat is to be examined, the swab is removed and is rubbed gently over the diseased portion of the child's throat. It is then returned to the test tube, the mouth of which is again plugged with cotton, and the tube is packed and sent to the bacteriologist for examination with a note, giving the date, name and address of the patient and the reason why the specimen was sent.

A scholar found to have an infectious disease should be isolated, and any other members of his family who are attending school should be dismissed and not allowed to return until all danger of infection has passed.

The books, scribbling books and lead pencils belonging to an infected child should be burnt or sterilized with steam and the school room thoroughly disinfected with formaldehyde gas. After disinfection the room should be well scrubbed and then aired and left unoccupied if possible, for two days.

Tuberculosis will also call for peculiar vigilance on the part of the Inspector. This disease is not only prevalent in Ontario among grown people, but is also noticed among children. Its early recognition in a scholar is of great importance ; for treatment to be successful, it must be begun in the first stage of the disease, and, as it is highly contagious, it is necessary that the infected scholar should be dismissed. No person, teacher or scholar who has consumption, should be allowed to remain in a school.

The vision and hearing of each pupil should be tested, and accurate information on these points given to the teachers and parents.

The relations of the medical inspector to the principal of a school, will be such that there need not be any misinterpretation of his office. He is simply a medical expert, prepared to recognize disease when present in a child, but not called upon to offer suggestions or advice as to its treatment unless, of course, in case of emergency. After examining th-

child in the presence of the principal, the Inspector should make out his report, ordering that the scholar remain in the school or be sent home. If sent home, a note or printed form be made out, stating the disease the child has, with remarks, etc. Copies of these reports should be sent to the local board of health and the school trustees, every month. If such a system of medical inspection were inaugurated in this or any other city in Ontario, there is every reason to believe that without any extraordinary efforts being made or public business severely disturbed, many cases of infectious disease would be recognized, isolated and prevented from spreading any further in the municipality. Experience gained in the field of medical school inspection, would naturally train the mind of the Inspector to observe and note the respective merits and demerits of physical conditions in a school, in so far as they might be favorable or unfavorable to the health of the scholars. He would be in a position to observe and note the effects of the different means used in warming, ventilating and purifying the air, and of disposing of excreta in schools. His views would be practical and not, theoretical. Statistics on school hygiene, drawn from the reports of such medical inspectors, would naturally have great authority, and would be most valuable to boards of trustees and boards of health.

Your committee are of the opinion that this board should pass a resolution expressing approval of the appointment of medical inspectors by boards of school trustees, and that copies of the resolution be sent to the Hon. G. W. Ross, Minister of Education, and the Hon. E. J. Davis, Provincial Secretary.

All of which is respectfully submitted,

(Signed),

J. J. CASSIDY, M.D.  
P. H. BRYCE.

## REPORT ON THE PUBLIC SCHOOLS OF PARIS.

By P. H. BRYCE, M.A., M.D.

TORONTO, Nov. 25th, 1899.

*To the Chairman and Members of the Paris Public School Board:*

GENTLEMEN,—At your request, contained in a letter from your secretary, dated Nov. 16th, 1899, I beg to report on the sanitary condition of your public school buildings. Owing to the notes taken at the time of my inspection not being available at present, I am unable to give measurements of rooms, but the following statements will supplement the remarks made at my meeting with the board.

### KING'S WARD SCHOOL BUILDING.

*Basement.*—Latrines in good condition, and if the ventilation by windows and vent-pipe are cared for no unsanitary condition will occur. The basement furnace room was not maintained in as cleanly a state as is desirable; but the space in itself left little room for complaint. The fresh air boxes supplying ventilation were found to be both practically closed, and as one of the windows of the latrine room was closed, it was apparent that inexcusable carelessness and neglect exists on the part of the caretaker in the performance of his work. The result of this lack of fresh air was apparent even at the early hour the school was visited. Although the day was pleasant and the windows might have been opened, yet in one room especially in the lower flat the air was close and gave evidence to the senses of a chronic lack of fresh air. Other rooms were not so bad; but it is apparent that if teachers and caretaker do not do the best with the means at their command, no system of ventilation would be very effectual. With, however, the number of children present, the simple supplying of air by the flues working at their best will be insufficient. Indeed, until a system of forcing in fresh, warm air is adopted in your schools, and in those of other towns, the ventilation will be inadequate. An old disused register in one room was the receptacle of dust, which apparently no regular attempt is made to clean.

### THE HIGH SCHOOL BUILDING.

This is an old building, and, except in the middle public school room, is in a very unsatisfactory sanitary condition. The absence of proper and adequate means of ventilation exists in every room. The basement is dark and damp, and, with the building close to the ground and the floors old, demands some radical remedy involving a very considerable outlay. Indeed, such an old-time building can doubtfully ever be made over into a satisfactory school building.

### THE NORTH WARD SCHOOL

is simply a primitive building with no pretensions to being even moderately equipped as a school. The door was open at the time of my visit and the air good, but in cold weather and a full school it would necessarily be detrimental to the health of the pupils. The closets were of the same primitive privy type and similarly to be condemned.

### THE SOUTH WARD SCHOOL BUILDING.

The situation, as well as the very old building are such as to demand a prompt remedy on the part of the Board. The privies are filthy to a degree, while the dark crowded rooms,—with no attempt at adequate ventilation,—are such as to call for a recommendation on the part of the Inspector that the town be deprived of its government grant if pupils are to be longer condemned to attendance in such a place.

It is apparent both from what I have seen and what I learned in conversation with your Board that the situation I have described is one which has been looked upon by yourselves and citizens as demanding a prompt remedy.

Contagious diseases have existed to an unusual degree amongst the school children during the past year, and while there may have been in some instances a recurrence of cases owing to children returning to school too soon after sickness, yet the condition of the school buildings is such that any attempt to cleanse and disinfect them must prove difficult, while the crowding and lack of ventilation must make the dissemination of disease from one pupil to another almost inevitable. In so progressive and well-to-do a town as Paris the time seems to have arrived when a large new public school building or buildings must be supplied, with a sufficient air space for each pupil, and equipped with some modern mechanical means by which an adequate amount of warmed fresh air supplied with normal moisture can be introduced. It is daily being brought home to parents, teachers and physicians that the school becomes to a larger degree than any other, the cause of general ill-health, short-sight, and contagious disease in our children,—who, for at least ten years of the formative period of their lives are required to spend so many hours within them. If compulsory education is demanded it seems clearly the duty of those in charge of our schools to make the conditions of school life an aid rather than a hindrance to the physical and mental growth of our children.

I have the honor to be,

Your obedient servant,

P. H. BRYCE,

SECRETARY PROVINCIAL BOARD OF HEALTH.

### REPORT ON THE INVESTIGATION MADE INTO THE CONDITION OF THE GRAND TRUNK CATTLE YARDS AT THAMESVILLE.

By P. H. BRYCE, M.A., M.D.

Sept. 5th, 1899.

*Mr. Chairman and Gentlemen of the Provincial Board of Health :*

GENTLEMEN,—The Board, as seen in the correspondence herewith submitted, having been called upon to investigate the condition of the cattle yards of the Grand Trunk Station at Thamesville, your secretary, with the consent of the Minister, proceeded to Thamesville, and, on Sept. 5th, 1899, made, in company with the reeve, several members of the local board of health, and the board's solicitor, an investigation of the said cattle yards.



We found the situation as follows :—On the railway reservation, within 100 feet, or thereabout, of the passenger station are the cattle yards, consisting of a weigh yard 18 feet by 42 feet, and a yard proper 68 feet by 48 feet, surrounded with a tight board fence 5 feet high and floored in part with old railway ties, the balance, about one third, being thinly covered with cinders. From this yard is a gateway with inclined plane leading to the cars. Along the fence to the south are two tanks or water-troughs raised two feet from the ground to hold water for cattle, while lying loose in different parts of the yard were six ordinary V-shaped wooden pig-troughs. The floor of ties has depressions in it in all directions, leaving an uneven surface wherein dung and food thrown out of the troughs can accumulate, and more or less of such—dried or drying—covered the whole area, giving out an effluvium most disagreeable, as it always is from pig manure. No pigs were in the pen when visited. While there is a fine railway water-tank supply just across the tracks, no conveniences for washing down the yards exist, and if there were there is no drainage from the yards.

On information from the Board, as also from the railway agent, it appears there is, besides cattle and sheep, an average of two to three carloads of hogs collected in the yards and shipped weekly. About 150 to 160 hogs make up a car-load. They are usually shipped twice a week, on Mondays and Thursdays.

It is hardly necessary for your secretary to state that under the conditions described a serious effluvium nuisance exists. Residences of villagers are across the road from the yards, and one witness living within a block stated that some nights after a hog-delivery day, it was necessary on a hot summer evening to close the house windows to prevent sickness and nausea from the odors.

Therefore, on investigation being satisfied as to the existence of a "nuisance and unsanitary condition," your secretary, as provided in section 72 of The Public Health Act, would recommend to the board as follows :—

1st. That as provided in sub-section 2 of section 72 of chapter 248, R.S.O., 1897, the Local Board of Health of Thamesville be supplied with a copy of this report, also the Grand Trunk Railway authorities through their agent in charge of the premises, and farther, that a copy be transmitted to the Minister of the Department to which this Board is attached.

2nd. That under section 29 of the same Act, cap. 248, R.S.O., 1897, the Local Board of Health of Thamesville be instructed to have the nuisance abated as provided in sub-section 2, section 72, chapter 248, R.S.O., 1897.

#### RECOMMENDATIONS.

In lieu of the removal of the cattle-yards to a more distant portion of the Grand Trunk property, of which the company possesses a large acreage to the west of the village, your secretary would recommend as a suggested mode of abatement of the nuisance :

1st. That the company lay a concrete or asphalt floor on the top of the present bottom, having previously laid five rows of field tiles to prevent the heaving of the cement in winter.

2nd. That from the floor the manure and filth be removed after each shipping-day in barrows or carts to some proper field, and there plowed under.

3rd. That a hydrant with proper hose attachments be provided so that the floor may be regularly flushed, and that the drainage therefrom be carried to a shallow covered tank, whence it may be pumped or carted away to fields or gardens ; or else that from the tank, provided with a valve, the sewage be discharged into a drain emptying finally into sub-surface field tiles of sufficient capacity to hold the contents of the tank—this being quite possible owing to there being a lower excavated area of land on the railway property to the east.

As the Public Health Act provides for an application to the High Court for an order to restrain the proprietors from carrying on the shipping business until the nuisance is abated, it will be the duty of the local board of health of Thamesville to formally give notice to the company to have the nuisance abated within a specified period, after which it may make application to the Court.

All of which it respectfully submitted,

(Signed) PETER H. BRYOE,  
Secretary.

REPORT *RE* VENTILATION OF BRASS WORK SHOPS.

*By P. H. Bryce, M.A., M.D.*

*December 8th, 1899.*

*To James R. Brown, Esq., Inspector of Factories, Department of Agriculture, Toronto, Ont.*

DEAR SIR,—Replying to your letter of the 30th ult. regarding the condition of the brass foundries I visited with you on Tuesday, the 28th ult., I would say that in the Coulter factory the fan utilised in the cellar flat served to maintain the air there in a very good condition. With regard to the flat above the most objectionable part of the work carried on there is the brass polishing or buffing. The windows being open on the warm day, the dust from the brass grinding and polishing was moving generally away from the men; but on a colder day the air of the room, some 12 x 12 feet, must become laden with particles of brass dust which English authorities are agreed are, along with other metallic dusts, the cause of very many cases of chronic phthisis, bronchitis and asthma in very many workers. (See Dr. Greenlaw and Dr. Arlidge, English Reports on Trades Injurious to Health).

In 1894 Dr. R. M. Simon, Birmingham, England, dealt especially with the subject of the prevalence of disease amongst the many brass workers there. He says brass workers rarely attain old age, and provident societies formerly either altogether refused to enroll them or accepted them only at increased rates. "Brass ague is common with those who deal with the molten metal, while those in shops with much dust or acid fumes are liable to bronchitis and asthma."

In the Booth factory the open forges in room with low ceilings, burning coke and charcoal, while having hoods suspended over the fire, were even with open doors irritating to the throat; and when it is remembered that carbonic oxide is given off with the blue flame and is the most poisonous constituent of all water gas which causes so many fatal accidents, it is apparent that systematic means should be adopted in every case, where such forges and brasiers are operated, for rapid removal of gas by fans and the introduction of fresh air into those work shops.

I would therefore advise that a routine order be promulgated requiring systematic fan ventilation in all such shops. The buffing room in the Coulter factory should have a good extract pipe to draw its air to the fan now in the basement as a blower to the furnace. The Booth factory can by a similar attachment from the buffing room cause the dust to be drawn into the extract shaft of the fan now being put into place.

I have the honor to be,

Your obedient servant,

P. H. BRYCE,

Secretary Provincial Board of Health.

TORONTO, December 8th, 1899.

# ANNUAL REPORTS

## OF

### LOCAL BOARDS OF HEALTH.

#### BELLEVILLE.

REPORT OF DR. R. TRACY, MEDICAL HEALTH OFFICER.

BELLEVILLE, ONT., December 8th, 1899.

*To His Worship the Mayor and Council of the Corporation of the City of Belleville :*

GENTLEMEN,—I have the honor to submit the annual report of the Board of Health for the year ending 30th day of October, 1899.

The Inspector made the usual house-to-house inspection of the city, and, when occasion required, I visited personally with him any case requiring investigation ; the citizens generally complying with the orders made by the Board.

Had analysis made of the city wells and found them generally good ; when not so, had them thoroughly cleaned out and any unsanitary state corrected.

There has been a large number of cases of scarlet fever during the year. The disease has been prevalent over Canada and the United States. In all, 108 cases and 2 deaths have been reported. The houses have been placarded, and I personally saw to the thorough disinfection of a number of them.

Typhoid fever—14 cases, with four deaths. Ten of these were contracted outside the city.

Diphtheria—9 cases, with 3 deaths.

Whooping cough has also been prevalent, but no deaths recorded. As soon as a case was reported had the children prevented from attending school.

Chicken-pox has also been prevalent, and the same precautions have been taken. No deaths reported.

The number of deaths reported from contagious diseases, has, taking it in all, been very low. I had thought I had scarlet fever stamped out, but during the summer holidays, and owing to disease being of such a mild type, numbers of families had cases in which no physician was in attendance, and allowed the children to mix with others, thus causing the disease to spread, but now believe the trouble to be abating.

Milk licenses to the number of 66 have been issued by me, and from the beginning of the year the milk will be regularly tested and byres inspected.

The Inspector has faithfully carried out his duties, much to my assistance and satisfaction.

Respectfully submitted,

R. TRACY,  
Medical Health Officer.

#### BRANTFORD.

REPORT OF DR. F. G. E. PEARSON, MEDICAL HEALTH OFFICER.

BRANTFORD, November 1st, '99.

*To the Chairman and Members of the Local Board of Health :*

GENTLEMEN,—I herein present to you a report of the Sanitary Department of the city for the year ending October 31st, '99.

*Mortuary Statistics.*—The number of deaths, exclusive of still births, registered at the City Clerk's Office during the past twelve months was 239, which is estimated popu

lation of the city, as taken from assessor's report of 17,344, gives a mortality rate of 13.78 per thousand.

The causes of death were :

Scarlet fever.....	4
Typhoid ".....	16
Diphtheria and croup.....	2
Tuberculosis and phthisis.....	29
Pneumonia.....	17
Meningitis.....	9
Cholera infantum.....	9
All other causes.....	153

Two cases of typhoid occurring at the hospital of patients outside of the city.

The ages were :

Under 1 year.....	46
" 5 ".....	59
Over 60 ".....	67
" 80 ".....	16

*Scarlet Fever.*—Commencing at the close of '98, there has existed more or less of an epidemic of scarletina through the year, which for the most part was of a very mild type, and almost confined to one section of the city ; resulting in the infection of 82 homes, with 110 cases, and 4 deaths. The monthly rate of cases are as follows :

Nov. 18, Dec. 11, Jan. 2, Feb. 1, March 8, April 15, May 11, June 17, July 2, Aug. 5, Sept. 9, Oct. 11.

and as set forth in my last report to this Board, due largely to the infection of the School by children who from the extreme mildness of the disease, had never required the aid of a physician, and were thus allowed to go unreported and unisolated to carry infection where it would more rapidly develop, and which required much work to search out those who were the cause of the trouble, and have them sent home and isolated.

Then there was the difficulty of enforcing the required quarantine at the homes of those who in a few days were well enough to be about long before the period of infectiveness had elapsed ; more particularly was this the case in the warm summer months ; and although in many cases carelessness existed and the delinquents prosecuted, there were others in which it was impossible to expect efficient isolation, etc., when such limited means of doing so existed in their homes.

Again was it noted that although disinfectants were supplied, in many cases they were not properly applied, and thus reoccurrences were frequent. All of these alone with many other indifferences to the precautions that should be regarded in dealing with such diseases, brings up again the absolute need of an Isolation Hospital. For the proper care and isolation of these contagious diseases which cannot be successfully combatted without, and at the same time relieve many of our citizens from the expense and inconvenience which they are subjected to in trying to carry out in their own homes the required isolation, etc., that such an hospital should provide. I would, therefore, once more urge upon this Board, that no effort be spared to have at once, either by contract with the Hospital authorities, or otherwise, some means of effectually dealing with these diseases.

*Typhoid Fever.*—Including with typhoid those cases of doubtful character and reported as fever and suspected typhoid, some few of which are probably malarial, there has been reported from the city, during the last year in all 154 cases, with 14 deaths occurring as follows :

Cases.—Nov. 5, Dec. 2, Jan. 0, Feb. 1, March 0, April 0, May 1, June 1, July, 7, Aug. 59, Sept. 54 Oct. 23.

Deaths.—Nov. 1, Dec. 1, Jan. 0, Feb. 0, March 0, April 0, May 1, June 0, July 0, Aug. 4, Sept. 2, Oct. 5.

Excluding from the above, five cases had their origin outside the city, there occurred in wards No. 1, 34 ; No. 2, 33 ; No. 3, 25 ; No. 4, 15 ; No. 5, 42, and since the chief causes of typhoid are generally to be found as the results of hot and prolonged dryness of the season, the want of pure drinking water, and the lack of proper disposal of sewerage, etc., or more properly all combined, which I think is borne out in the above cases, for upon analysis we find that almost all the above cases occurred after the very dry summer

when all the wells became low, and although a few cases were scattered more or less generally over the city, the great majority were located in those districts where the source of water supply was chiefly from the wells, and where drainage and proper disposal of sewerage is wanting, seen especially in West Brantford, Eagle Place, and the northern part of ward 2, and again regarding the water supply, 90 were well, 26 well and city, and 32 city water users, and with regard to the city water users in almost every case was local causes sufficient to produce the disease, as for example, 8 cases occurred where defective and foul cisterns ventilated themselves into the cellars, 3 others occurred in a house where the sink discharged into the cellar, etc., etc. It has also been found from a series of tests of well water taken in various parts of the city, that it was almost universally contaminated with organic matter and sewerage, thus the probable source of disease. While we were at the same time assured from repeated tests by J. J. McKenzie, Provincial Bacteriologist, of the good standard of purity of the city supply.

Therefore, regarding the mitigation of typhoid, it was recommended that where the public supply could not be obtained, all well water used for drinking purposes should be boiled. That there should be a general extension of the city supply in those localities not yet supplied; and an enforced closing of all wells in infected districts, and furthermore, that in those parts of the city not yet supplied with a sewerage system should be attended to as soon as possible; and in this I refer particularly to the eastern part of Wards 4 and 5, where a trunk sewer should be extended along Rawden street, also West Brantford and Eagle Place, which, although probably requiring a pumping system, should nevertheless be provided for.

*Diphtheria and Croup and Measles.*—Of diphtheria and croup, there were reported for the period of this report in all 20 cases, with 2 deaths, both of which resulted from croup. There were 8 cases of measles and no deaths.

*Milk Supply.*—Regarding this product, which is so extensively consumed by the community, in its raw state, especially by the infant class, we have been mindful not only that a proper food standard is maintained, but also that it may not become a means of conveying contagion, in which unfortunately it sometimes plays a part. And regarding this latter it now seems very probable that, apart from other diseases, whose germs find in it a suitable breeding ground, milk is largely responsible for many cases of tuberculosis, as is shown by many investigations upon milk supplies, as per example in the city of Berlin, where 28 per cent. of the supply of the city was found to be infective, while the other investigations show such milk to be infective to animals from 5 to 55 per cent. of cases, etc.; and I am pleased to see that this board, seeing the wisdom of enforcing the tuberculin test a year ago upon the herds supplying milk to the city (out of which eleven cattle reacting to the test were slaughtered, and upon post mortem revealed distinct tuberculosis) are in future insisting upon an annual test of all herds from which the city is supplied, and demanding a clean bill of health of such herds before permits are granted.

*Garbage System.*—As dealt with in previous reports, I must again remind you that the city has outgrown the present haphazard means, and has arrived at a period when some thorough and systematic means for the collection of garbage and house refuse should be inaugurated, and to this end I would suggest that this board recommend the council to provide three or four suitably constructed wagons or carts, under the management of the Streets Department, to make weekly and semi-weekly rounds in the various parts of the city to collect such refuse which is placed on the streets in suitably covered boxes by the householder between the hours of collection on his street; then that which is inoffensive could be used for filling-in purposes in dumps, which then could be controlled and kept in proper shape, while that which was offensive should be cremated.

#### SANITARY WORK.

Although somewhat delayed in this work during the first part of the year, on account of the urgent demand upon the Police Department, from which the sanitary inspector is supplied, a fair amount of work was accomplished, and is as follows:

*Sanitary Inspector's Report.*—Besides a thorough inspection of 31 dairies supplying the city, numerous milk tests were made. A house to house inspection in which, besides 262 irregular inspections for contagious diseases, etc., 675 premises and houses were

thoroughly gone over. Two hundred complaints were investigated, and where nuisances existed orders issued to abate such. Twenty prosecutions were made for violators of the Health Act, and in each case convictions were obtained; 138 privy pits were cleaned and filled up and substituted with dry earths or water closets; 62 wells were cleaned; 36 sewer connections were ordered in. Along with the above was the disinfection of schools and houses with Formaldehyde for contagious diseases.

#### *Recommendations.*

1. That the fire hall be connected with sewer.
2. That the creek running through Wards 4 and 5, emptying in canal at power house be cleaned.
3. That a ditch or drain be placed on Washington street to keep surface water from flooding the premises below Terrace Hill.
4. That persons that collect swill and garbage should have a light waggon-box with cover, so that the contents may be kept from being offensive on the street.
5. That sewers be placed on Alfred street, between Wellington and Nelson; also on James street, between Brant avenue and Pearl streets.
6. That the closets in Vanstone's lane, rear of George street, be all connected with sewers.

### CHATHAM.

#### REPORT OF DR. W. R. HALL, MEDICAL HEALTH OFFICER.

*To the Chairman and Members of the Chatham Local Board of Health:*

GENTLEMEN,—I herewith submit my annual report for the year ending December 31st, 1899.

Scarlet fever was reported as follows:

January .....	5 cases.
February .....	3 "
March .....	1 "
April .....	3 "
Total .....	12 cases.

Diphtheria was reported as follows:

August ... ..	1 case.
September .....	2 "
October .....	7 "
November .....	3 "
December .....	1 "
Total .....	14 cases.

It is a source of congratulation that there were no deaths and so few cases of contagious disease, when we consider the fact that there were two distinct outbreaks of scarlet fever and at least four outbreaks of diphtheria.

This favorable condition of affairs is due chiefly to these two factors, the physicians of the city recognizing the disease early and report them promptly, and the excellent facilities for isolating patients afforded by the isolation wards connected with the General and St. Joseph Hospitals of the city.

These wards are of great advantage not only to the city, but the adjoining municipalities in stamping out contagious disease.

Fourteen deaths were reported from consumption. Four of these were patients brought into the hospitals where they died, but did not at any time belong here. The death rate from this preventative disease is very high, about 1 in 1000.

The total number of deaths recorded was 169, but 10 of these were hospital patients from outside municipalities, so that our true death rate was 15.9 in 1000 or 1.59 per cent.

*Typhoid Fever.*—Only 11 cases of typhoid fever were reported, all of which recovered. The typhoid cases seem to occur among the users of well water only, and I would suggest as the best means of stamping out, or at least limiting, this disease the extension of the water works to all parts of the city, and encouraging by a low water rate all citizens to

use it. One hundred and sixty-eight new connections were made with the water works during the year, and five wells were closed because the water was found unfit for use.

*Building Condemned.*—A number of dwelling houses reported by the inspector as unfit for human habitation were carefully examined by committee of the Board of Health, and six dwellings were condemned by the Board, four of which were torn down and two were repaired.

*Health By-laws Revised.*—Section 1, Schedule B, amended re examination of well water and condemnation of well water if found bad.

Rule I., Schedule A, Section 14, requiring the city engineer to send in a list of sewers in the city fit to make closet connections with.

Rule V., Schedule A, Section 14, amended by inserting 1st instead of 15th in the third line.

Rule VI., Schedule A, Section 14, amended by inserting April instead of May in the fifth line.

Rule VII., Schedule A, Section 14, amended by making it apply to keeping of hogs the whole year, and increasing the distance to 100 feet from dwellings, streets or streams.

Rule VIII., Schedule A, Section 14, amended by striking out 15th of May and 1st of November and inserting 15th of April and 15th of November.

And a by-law defining where ice may be cut for the city, forbidding the use of McGregor's Creek and all parts of the river except east from a point 150 feet east of the foot of Seventh Street.

*Slaughter Houses.*—Slaughter houses are not permitted in the city, but five slaughter houses used by the butchers of the city are regularly inspected and are in a satisfactory condition.

There have not been any complaints of diseased meat, fowl, or fish on the market this year.

*Milk Supply.*—All cows are licensed by the Board after being inspected first by the inspector, and if he reports any cows suspicious they are then examined by a veterinary surgeon employed by the Board. Licenses are not granted unless the conditions laid down are complied with. The milk is subject to examination at any time. This year it was found to be well up to the standard in every case.

There were only two prosecutions under the by-laws, both of which were successful.

WM. R. HALL,  
Medical Health Officer.

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## HAMILTON.

REPORT OF DR. ISAAC RYALL, MEDICAL HEALTH OFFICER.

Hamilton, Ont., November, 1899.

*To the Chairman and Members of the Local Board of Health:*

GENTLEMEN,—The sanitary condition of the City for the year ending 31st October, 1899, shows a marked decrease in the number of cases reported of diphtheria and scarlet fever.

This year, diphtheria cases number 102, with 13 deaths, against 162 cases, with 20 deaths, the previous year, showing a decrease of 60 cases.

Scarlet fever cases number 123 cases, with 5 deaths, against 214 cases and 10 deaths, giving a decrease of 91.

Seventy-four cases of typhoid fever, with 14 deaths, were recorded against 37 cases, with 6 deaths, in 1898. This increase was possibly due to the very dry season, although the latter could have had no influence over the water supply such as exists in country places.

Fourteen cases of diphtheria were reported from the Boys' Home which were imputed to the offensive odors emanating from the manholes in the streets. The sewers have been frequently flushed and lately were found to be in a clean condition by the ward foreman. I think it would be better to close the manhole openings and have a ventilator placed higher up the street. Two cases were also reported from the Girl's Home ; all the cases were sent to the Isolation Hospital.

Other contagious diseases reported were : chicken pox, 43 cases ; measles, 36 cases ; whooping cough, 109 cases, with 7 deaths ; and mumps 38 cases.

Our citizen mortality has been less by 56 cases. Last year the total deaths were 710, one death not having been reported until the following month, after my report was sent in ; the deceased was buried elsewhere which accounts for the omission.

The deaths for the year past number 653 ; males, 329 ; females, 324. The population as given by the assessors was 51,011 ; this gives a death rate of 12.82 per 1000. Total still born, 47.

I noticed a few discrepancies in the registration of deaths given by physicians and the cause of death given to the cemetery, which would indicate that the law relating to burials has not been fully complied with, notably that which requires the Registrar's certificate before burial, which is a very important item.

There were 19 deaths recorded from accidents, of which 7 were from drowning ; also 3 railroad, and 9 from other causes.

Deaths of children under 5 years number 168 ; of this number 119 were under one year, several surviving only a few hours.

The mortality from consumption still ranks high ; about 68 cases reported this last year. It is to be hoped that the philanthropic efforts used to avert the disease will prove beneficial, if not altogether effective.

Respectfully submitted,

ISAAC RYALL,

Medical Health Officer.

*Summary of the work of Milk Inspector L. A. Macdonald.*

Number of licenses issued good to 30th April, 1900.....	218
Samples collected and tested .....	421
Shops inspected .....	148
Dairies inspected.....	168
Cow byres inspected .....	179
Cow byres found in dirty condition .....	3
Cows found in dirty condition .....	1

*Summary of Sanitary Inspections, John Peacock.*

Number of inspections made .....	7,160
“ of privy vaults notified to be cleaned.....	665
“ “ permits issued to contractors.....	1,007
“ “ given for .....	17
“ “ abolished .....	72
“ cesspools, permits issued to contractors .....	35
“ “ given for new ones.....	5
“ “ abolished.....	9
“ dry earth closets, notified to clean.....	24
“ sewer connections, notified to make .....	22
“ “ found defective.....	141
“ foul drains, to abolish.....	11
“ stagnant water, to abolish.....	14
“ dirty premises, to clean.....	14
“ other nuisances, to abate.....	779
“ old wells filled in .....	2
“ houses placarded for infectious disease.....	168
“ “ fumigated by inspector.....	176



Burials in Hamilton Cemetery.				Holy Sepulchre.			Distant burial grounds.			1898-1899.				Contagious diseases by months.												
1899.	No. of interments.		Citizen mortality.		Citizens.			Citizens of all denominations.			Combined mortality.				Month, 1898-1899.	Diphtheria.	Scarlet fever.	Typhoid fever.	Measles.	Whooping Cough.	Chicken Pox.	Mumps.	Total.			
	Total burials.	Non-residents.	Total.	Males.	Females.	Total.	Males.	Females.	Citizens.	Males.	Females.	Still-born.														
Monthly obituary.																										
November .....	38	6	5	27	14	13	2	2	3	2	2	5	32	17	15	9	5	November .....	22	5	3	3	3	39		
December .....	51	10	6	35	19	16	10	7	3	2	2	6	48	27	21	6	6	December .....	9	4	1	1	3	18		
January .....	64	8	1	55	23	32	8	5	1	2	9	1	74	30	44	1	1	January .....	7	9	1	1	19	45		
February .....	60	12	3	45	23	23	14	8	7	5	2	3	66	32	34	3	4	February .....	8	14	1	1	5	38		
March .....	53	6	5	42	26	17	7	3	2	2	5	6	62	39	23	6	5	March .....	5	6	1	1	5	21		
April .....	42	10	2	30	16	14	10	5	1	1	1	3	42	22	20	3	3	April .....	3	8	3	5	3	32		
May .....	37	7	2	28	10	18	9	4	5	2	2	2	41	16	25	2	5	May .....	8	5	1	10	19	74		
June .....	45	13	2	30	17	13	13	7	8	3	3	2	51	29	22	2	2	June .....	20	8	1	13	23	7		
July .....	47	7	4	40	25	15	9	5	10	7	1	8	59	33	26	3	8	July .....	5	7	5	5	7	30		
August .....	74	7	7	60	29	31	14	6	9	4	4	1	83	40	43	8	8	August .....	8	4	26	...	15	53		
September .....	47	14	...	33	16	17	11	4	7	5	1	3	51	22	29	3	3	September .....	3	16	21	3	6	1		
October .....	43	8	4	31	15	16	3	1	2	4	4	6	44	22	22	6	6	October .....	4	37	12	...	7	1		
	601	108	37	456	231	225	110	57	53	6	4	4	653	329	324	47	47		102	123	74	36	109	43	38	536

COMPARATIVE STATEMENT OF DIPHTHERIA, SCARLET FEVER, TYPHOID FEVER.

1898. 1899.

Diphtheria .....	162	101
Scarlet fever .....	214	123
Typhoid .....	37	74

Diphtheria being 60 cases less ; scarlet fever being 91 cases less ; typhoid being 37 increase.

## LONDON.

REPORT OF DR. T. V. HUTCHISON, MEDICAL HEALTH OFFICER.

January 2nd, 1900.

*To the Chairman and Members of the Local Board of Health.*

GENTLEMEN: I have the honor to submit the following report upon the sanitary conditions of the city, and other matters relating to the public health for the year ending November 15th. It is to a certain extent supplementary to reports already laid before you. The sanitary condition of the city was never better. This will readily be seen by the small number of deaths due to preventable diseases, such as typhoid fever. All of the infectious diseases were of mild types.

Four hundred and ninety-nine deaths took place during the year, exclusive of twenty-four (24) still-born. Of this number consumption caused the deaths of fifty-six, and pneumonia forty-three. These two diseases of the lungs took off ninety-nine persons, or one-fifth of the whole number. Heart disease and heart failure are given as the cause of fifty-seven deaths.

There were three hundred and sixty-three cases of infectious diseases reported in the year. They were of mild types, there being only twenty-three deaths, as follows: Scarlet fever 238 cases, and eight (8) deaths; diphtheria 71 cases with nine (9) deaths; typhoid fever 54 cases and six (6) deaths. Of this number 180 were attended at the city hospital, and twenty-nine at St. Joseph's. The mortality from infectious diseases, it will be seen, was extremely low. The death rate for the year was 12.7 for every 1,000 of the population. There were only six deaths from typhoid fever, the lowest number for many years. This may be taken as evidence of the cleanly state of the city.

La grippe caused the deaths of seventeen and cancer twenty-seven. The latter disease is becoming more prevalent every year, not only in this city, but in the whole province. With the exception of scarlet fever, diseases of infants and young children were few. There were only eight deaths from cholera infantum, two from croup, one from whooping cough, and one from chicken pox. The number of deaths due to inflammation of the lungs was large, the disease in elderly persons being a sequence of or complicated with la grippe.

Leaving out the disaster at the City Hall there is an increase over former years in the number of deaths by violence, viz.: twenty-one (21). It will be comforting to those turning the four score mile post to know that the comparatively large number of twenty-one (21) deaths are credited to old age, their years ranging from eighty-five (85) to ninety-nine (99) years. No epidemic visited the city. Although small-pox has appeared in several of the neighboring municipalities, London is still free from it.

Of the two nurses who were under contract with the Board to attend cases of this disease should their services be required, one is dead and the other "non est." So soon as safe and competent nurses can be found they will be engaged.

The inspection of herds, dairies, and milk supplied the city during the year, has been very carefully done. Ninety-seven herds were inspected and one hundred and twelve samples of milk collected by the inspectors, were examined. One sample was adulterated by removal of cream, and three bad cream added. By reason of the dry summer and autumn the quality of the milk was unusually good, the average per cent. of butter-fat being over four, or to be exact, 4.17 per cent. Chiefly to this and pure water may be attributed the small number of deaths among infants. Cancer was found in the owner and caretaker of one of the herds. The sale of milk from this dairy was promptly stopped. Another had his milk license cancelled for unclean premises.

The public schools of the city are periodically inspected as to their sanitary condition—heating, lighting, ventilation, and the health of the pupils.

The action taken by the Board of Health in notifying physicians and heads of families neglecting to report all cases of infectious diseases coming under their notice, would be prosecuted, has had a good effect, as the large number reported will show. It is through the public schools that much of the scarlet fever is spread. A child who has a sore throat or some slight ailment for which it is not necessary to consult a physician, is kept home a few days, and then sent back to school to give scarlet fever or diphtheria

to his or her classmates. It is in the power of three classes of people to reduce the number of cases of infectious diseases to a minimum, viz. : physicians, parents and teachers. No fault can be found with the latter. They conscientiously do all in their power to keep infection out of the schools.

Early in the year the city council determined that under the Municipal Improvement Act, no more plank walks should be put down, and that all walks laid should be permanent ones. This was a move, and a very proper one, in the right direction, for which the council deserve the thanks of the citizens. Rotting wooden pavements are insanitary, vile smelling, and in no way conducive to the public health.

The population of the city is now 39,000.

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## OTTAWA.

ANNUAL REPORT OF DR. A. ROBILLARD, MEDICAL HEALTH OFFICER.

Ottawa, 12th December, 1899.

*To the Chairman and Members of the Local Board of Health.*

Gentlemen,—

I beg to lay before you the Annual Report of the Health Department for the year ending October 31st, 1899.

The past year, I am pleased to say, has not been marked by any serious outbreak of epidemic disease of any kind. Smallpox, which during last winter made its appearance, at three or four different points within the province, we have fortunately escaped, thanks to the steps taken by the Provincial Health Authorities, to prevent the spread of that loathsome disease.

The total mortality for the twelve months comprised in this report, as shown in table 1, here appended, has been from all causes 1173, exclusive of still births.

In appreciating the mortuary statistics of this city, we should not overlook the fact that over and above the deaths of residents of the city these figures include as a not inconsiderable number of fatalities occurring among non-residents who came here from the surrounding districts to be treated in our hospitals, and succumbed to their maladies, especially is this the case as regards such infectious diseases as Scarlet Fever, Diphtheria and Typhoid Fever, originating in the surrounding suburbs of the City. Then again, these figures also include the death roll of the Foundling Institution, the inmates of which are received from all over, and even beyond the limits of this province.

Did we exclude all such outside cases, as is sometimes done in other cities we could easily reduce rate to 18 per thousand or possibly less. The figures above given represent the number of burial permits issued by the registrar during the twelve months ending on October 31st and consequently include all the deaths that occurred in the City during that period.

With our estimated population of 58,000 this gives us a death rate of 20.2 per thousand of the population, which under existing circumstances is a fair showing. Out of the total mortality 517 deaths were of children of five years of age and under including the mortuary records of the House of Bethlehem, which are given in Table IV here attached. As usual the chief causes of mortality among children have been Diarrhoeal and other diseases incident to dentition, which during the summer months, more than decimate the infant population, and infectious diseases such as scarlet fever and diphtheria, a certain number of which cases we have always with us. Among adults, by far the largest factor in our death roll is consumption with its ever increasing quota of yearly victims. Typhoid fever, which is also a yearly visitor, made its appearance last season somewhat earlier than usual, it as well as other diseases were slightly in excess of the previous year. That the causation of such maladies is often due to the unhealthy conditions of the dwelling house or surrounding premises or both, cannot be reasonably disputed, nor can it be justly denied, that aside from the reckless indifference of many individuals as regards these sanitary matters, other reasons did exist which in many instances, were largely contributory to the causation of such insanitary conditions.

The want of proper sewers in a large section of the City, the want of a public system of scavenging, and lastly the want of sufficient help in the Health Department to exercise power supervision over and enforce cleanliness throughout the city were undoubtedly large factors in their existence. The want of drainage, I am glad to say, will be remedied in the near future by the completion of the main sewer now in process of construction.

With regard to a public system of scavenging to effect the proper disposal of household refuse, that I regret to state is not yet in view, nor will it ever be inaugurated to comply fully with the laws of sanitation until the city has an incinerator to effect the destruction of all garbage subject to rapid decay. The number of infectious diseases reported to the Health Authorities during the past year are shown in Table III here attached. That the isolation hospitals have done good work during the year is evidenced by their records as they appear in Table II here appended.

The regulations of the local Board of Health in relation to the ice supply of the city for household consumption have been complied with during the past year, except in one instance, which in no way endangered the public health in so far as that article was concerned.

But few samples of milk were tested by me during the past year. Judging however from the fact that it is very seldom indeed any complaint is made about that very generally used article of food, it can be safely inferred that our milk supply is generally good.

For the work more immediately under the control of Sanitary Inspector, Mr. Cawthray, I beg to refer you to that gentleman's comprehensive report here attached.

Respectfully submitted,

(Signed) A. ROBILLARD, M.D.

*Contagious Diseases.*

	Protestant Annex.			R. C. Annex.		
	Diphtheria.	Scarlatina.	Measles.	Diphtheria.	Scarlatina.	Measles.
Admitted during the year.	72	62	..	109	52	2
Discharged " "	59	59	..	99	52	2
Deaths " "	7	..	..	10	..	..
Nine of the above recorded cases were from outside the city.				Thirteen of the above recorded cases were from outside the city.		

N.B.—It is but fair that I should state that in a number of fatal cases above recorded the death occurred within twenty-four hours, the patient being taken to the hospital in a moribund state.

*Showing number of infectious diseases reported during year 1899.*

Diseases.	No. of cases.
Diphtheria including croup .....	102
Scarlet fever .....	138
Typhoid fever .....	308
Measles .....	15
Total .....	463

*Record of the House of Bethlehem for year 1899.*

How disposed of.	No. of cases.
Admitted during the year.....	267
Placed outside or returned to parents.....	137
Died during the year.....	103
Remaining in house on November 1st, 1899.....	17
	267

*Sanitary Inspections.*

I beg to submit for your consideration my Annual Report showing the work done in the sanitary department during the year ending October 31st, 1899.

In addition to the work in tabulated form undermentioned there have been :

162 houses disinfected ; 50 cards put up ; 40 cards taken down ; 26 drains tested for defective plumbing ; 167 written notices to property owners, tenants and others, the balance verbal ; 6 summonses were issued in every case of which a conviction was obtained ; 3,252 privy vaults cleaned.

*Dumping grounds.*—The two dumping grounds owned by the city have received due attention and the general absence of complaint certifies to the effective work being done.

*The various trades.*—The inauguration of the inspection of the various trades which may become offensive has been entered upon this year, resulting in sanitary improvement in several establishments and the closing up of business in three instances.

*Dairy farms.*—A systematic inspection of the dairy farms has been made this year. I visited last winter forty-two dairy farms situated mostly in the township of Gloucester, Hull and Nepean. Apart from the number of nuisances mentioned in the table, I found that the majority of the cows were not cleaned or groomed as well as they should, and also a want of proper milk storage in winter, separated from contamination from the dwelling, existed extensively.

*Inspection of yards.*—Owing to the small staff, this part of the work has not received the attention it requires, but what has been done proves without the need of a scavenging system or at least more assistants to force individual efforts to remove nuisances.

*Plumbing.* The very small percentage of the complaints registered at the Health Office relative to defective plumbing shows that on the whole the work done in this city must be of a substantial nature.

*Supervision of ice cutting.* A new feature in the supervision of ice cutting has arisen owing to dealers in the suburbs of Ottawa East, Tetreauville and the neighboring city of Hull becoming purveyors of ice to this city. The localities mentioned not having the safeguards required by this city, it consequently necessitates the supervision of ice cutting not only of the city of Ottawa, but also of the suburbs mentioned, as well as the city of Hull. To facilitate this matter new rules and regulations should be added to those now existing.

In conclusion I wish to acknowledge with thanks the valuable aid I have received from the chairman of the board and the Medical Health Officer in the discharge of my duties. I also willingly bear testimony to the effective work done by my sole assistant in the sanitary department.

Respectfully submitted.

(Sgd.) JOHN CAWTHRAY,  
Sanitary Inspector.

*Classified list of nuisances under notice of the department during the year.*

Description of Nuisances.	Reported by Sanitary staff, tenants and others.
Refuse on streets, vacant lots, etc. ....	67
Filthy premises. ....	524
Illuminating gas. ....	9
Offensive odors from sewer gas entering houses. ....	20
"                    other sources. ....	40
Drains choked. ....	17
Sinks untrapped. ....	3
Soil pipes unventilated. ....	4
"                    defective. ....	19
Water closets broken or otherwise defective. ....	7
"                    service breaking. ....	10
Deficient water supply. ....	2
Defective waste pipes. ....	17
Water in cellars. ....	100
Roofs leaking. ....	5
Piggeries near dwelling or otherwise unsanitary. ....	30
Want of drainage. ....	61
Offensive trades. ....	5
	940

*Inspection of the various trades.*

Name of Trade.	Reported by Sanitary staff.		
	No. of places inspected.	No. of nuisances found.	Trade closed.
Butchers' shops and premises. ....	26	10	None
Slaughter houses. ....	4	None	None
Pork packers. ....	4	2	None
Junk dealers. ....	4	1	1
Hide dealers. ....	2	1	1
Tallow renderers. ....	2	1	1
Dairy farms. ....	42	19	None
Milk vendors only. ....	6	2	None
	90	36	3

*Tabulation of dairy farms inspected.*

Townships.	Samples of water collected for analysis of wells.	No. of premises inspected.	Privy too near cow byre or storeroom.	Foul store room.	Pigs in cow byre.	No ventila- tion in byre.	Well too near byre.
Hull, Nepean, Gloucester.	90	42	4	7	3	2	3

*Inspections made to investigate the origin of disease, proposed drainage and other sanitary requirements.*

Areas and premises inspected.	No. of houses.	Object of investigation.	Nuisances found.
Area including Wellington, Sparks, Queen and Albert streets as far east as Elgin and westerly to Concession St.....	645	Garbage and filth in yard.	49
Boteler between Cumberland and King, Elm between Rochester and Division, Wellington between Lyon and Pooley's Bridge .....	109	Proposed drainage.	61
College Ave., Clarence, Kent, Percy, Cooper, Cartier, Creighton, Somerset.....	4	Origin of scarlet fever.	3
.....	5	Diphtheria.	4
.....	5	Typhoid.	3
	768		120

STRATFORD.

REPORT OF DR. J. A. ROBERTSON, MEDICAL HEALTH OFFICER.

Nov. 5th, 1899.

*To the Chairman and Members of the Local Board of Health :*

GENTLEMEN,—Again it is my pleasure to submit to you the annual report on the sanitary condition of the city for the year ending November 1st, 1899.

The number of deaths of residents occurring in the city during the year was 86, being three less than that of last year. Consumption heads the list with 22 victims, old age 12, heart failure 5, indigestion 5, cancer 5, accident 3, diabetes 3, convulsions 3, confinement 2, asthma 2, appendicitis 2, paralysis 2, Bright's disease 2, pneumonia 2, typhoid fever 2, bronchitis 2, tubercular meningitis 1, growth on brain 1, epileptic fits 1, pleurisy 1, inflammation of the brain 1, operation 1, cholera infantum 1, suicide 1, growth in stomach 1, septicaemia 1, obstruction of bowels 1, no cause given 1. Of these Romeo Ward contributed 25, Shakespeare Ward 29. Hamlet 13, Avon 9 and Falstaff 10.

Classifying the deaths according to ages we find

That between 90 and 100	1 died as compared with	0 in 1898
" 80 "	90 7	" " 11 "
" 70 "	80 8	" " 8 "
" 60 "	70 9	" " 9 "
" 50 "	60 5	" " 12 "
" 40 "	50 5	" " 7 "
" 30 "	40 7	" " 6 "
" 20 "	30 13	" " 12 "
" 10 "	20 15	" " 7 "
" 1 "	10 5	" " 9 "
Under one year	11	" " 7 "

From the contagious diseases diphtheria, scarlet fever, whooping cough and measles there have been no deaths during the year. There were 20 cases of scarlet fever and 4 of diphtheria reported. Last year there were 32 cases of diphtheria with 4 deaths, and 17 cases of scarlet fever with 1 death.

When any case of contagious disease was reported, the premises were inspected in order to ascertain, if possible, the source of the disease, the drinking water was examined, the houses placarded to prevent communication, the schools notified, and every other possible means used to prevent the spread. Our vigilant Health Inspector deserves credit for the care and attention he has given this matter.

The milk supply, which is frequently a medium of conveying disease, has been free from blame, no case of any contagious disease having been traced to it.

Our sewerage system is making steady progress and the plant for the sewage disposal almost complete. We look forward with a happy anticipation of the success of the scheme.

We have every reason to be grateful for the exceedingly healthy condition of the city during the past year, no case of any contagious disease having been reported since June 3rd, yet notwithstanding this, I cannot conclude this report without urging upon your Board, as I have in other former reports, the desirability of some action being taken whereby some scheme may be formulated to bring about the establishment of a contagious ward or hospital. Even in time of peace it is well to be prepared for war.

Your obedient servant,

J. A. ROBERTSON.

### ST. CATHARINES.

REPORT OF DR. E. GOODMAN, CHAIRMAN LOCAL BOARD OF HEALTH.

*To the Mayor and Council of the Corporation of the City of St. Catharines.*

GENTLEMEN,—In accordance with the requirements of the Public Health Act, I herewith submit my annual report of the sanitary condition of the City of St. Catharines for the year ending the 15th day of November. 1899.

The outbreak of a mild type of scarlatina, which occurred in October, 1898, has prevailed rather extensively during the present year, owing, in a great measure, to the apparent impossibility of securing proper isolation, and disinfection of clothing in cases of slight severity. There exists among many householders a dislike to have their residences placarded, with the inconvenience and annoyance attendant thereon. In consequence of this, it often happens that no physician is summoned, and the cases are not reported. The sanitary inspector, and the Board, have done everything in their power to stamp out the disease, and with a fair measure of success, as only a few sporadic cases are now being reported. In all 156 cases have been reported since the 15th of November, 1898, to date, with six deaths; a very small percentage of mortality.

There are now eight Miller automatic flush tanks in successful operation; and I would strongly recommend the installation of additional tanks as rapidly as the finances of the city will permit, until one is placed at the head of every lateral leading to the main trunk sewers. The advantage arising from the regular and frequent flushing of the sewers, before decomposition engenders noxious gases to poison the atmosphere is too obvious to need further reference thereto.

Your Board regrets that circumstances prevented the construction of a sewer on Church street this year, and trusts that this very necessary, and important sanitary improvement will not be overlooked by the incoming council.

You are doubtless aware that the combined efforts of your Board of Health, the Mayor and Council of the Corporation, and the Water Commissioners of the City of St. Catharines, as well as of the municipal, and health officials of the town of Welland, and the village of Merriton, failed to influence the proper authorities, to prevent the swamp lands of the township of Humberstone, and the several sewers and drains along the line of the Welland Canal, between Port Colborne and Welland, from being emptied into that body of water.

The serious results which may arise from this source of pollution cannot be ignored by those interested, as by far the chief part of the water supply of the residents of Welland, Merriton and St. Catharines is derived from the Welland Canal since the Lake Erie level has been obtained. The deposition in the canal of the intestinal secretions of a patient suffering from typhoid fever through any one of the several sewers and drains emptying into it might and probably would create a widespread epidemic of that dreadful disease among the thousands of people who derive their water supply from this source. It is quite possible that the excessively disagreeable smell and taste of the public water at St. Catharines, at present being complained of and noticed after the heavy autumnal rains, may be due in a great measure to the drainage from the swamp lands in the Township of Humberstone.



I would therefore recommend unceasing efforts on the part of all who obtain their water supply from the Welland Canal to have the sewers and drains emptying into it diverted away into Lyons Creek and other natural channels of drainage in the localities where these sewers and drains exist.

The high rate of mortality from tuberculosis, and the generally entertained conviction that the pathogenic germ which propagates it is imbedded in the sputa of persons suffering from the disease, should prompt those in authority, who have the power to do so, to prevent as far as possible the uncleanly and unsanitary practice of expectorating on the sidewalks, in the street cars and in front of the entrances to all public buildings and places of resort, and wherever the poison-laden secretion can do its deadly work on the persons of those exposed to its influence.

The Sanitary Inspector and Secretary of the Board of Health have faithfully discharged their respective duties. Their reports are herewith submitted. On consulting the accompanying report of the Secretary it will be observed that the number of deaths from all sources occurring in the city from the 15th November, 1898, to the 15th November, 1899, was 185.

Deducting from this number the deaths from accidents and premature births, 17 in all, I find that the rate of mortality, based upon a population of 10,039, is 16.29 per 1,000 of the inhabitants.

Respectfully submitted,

E GOODMAN,

Chairman Local Board of Health,  
St. Catharines.

## WINDSOR.

REPORT OF DR. J. COVENTRY, MEDICAL HEALTH OFFICER.

WINDSOR, ONT., Dec. 1st, 1899.

*To the Mayor and Council of the City of Windsor :*

GENTLEMEN,—As I was appointed Medical Health Officer on the 24th of March, I cannot report on the sanitary condition of the city for the whole year, except on matters of a statistical character, which makes the birth rate 20.46 per 1,000 and the death rate 18.73 per 1,000 in a population of 11,436.

In looking over Mr. Lusted's register of deaths, I find that "Heart Diseases" doubles any other one cause. Now, I do not think that heart diseases are on the increase, but this "cause" is being made the *dumping ground* for fatal cases of other diseases and surgical cases. In Scotland they used to say when a man died it was "for want of breath," and the one is just as good as the other for statistical purposes. A man or woman dying two or three days after an extensive operation, and the cause of death is said to be "heart failure," does not convey the truth in most cases, but renders statistics an unreliable guide.

From November 15, 1898, to November 15, 1899, there were reported 234 births and 152 deaths; 6 cases of smallpox, no deaths; 17 cases of diphtheria, no deaths; 48 cases of scarlet fever, no deaths.

Physicians are required to report cases of typhoid fever, but do not do so. The deaths from this disease is the lowest ever known in this city, being only two in number. From the time that this place was incorporated as a village, I do not believe there has been anything to equal the above record, and it is directly traceable to improved sanitary conditions. The improved water supply, with the intake pipe reaching out beyond shore contamination, is responsible for the reduction of deaths from water borne diseases.

Four deaths from diarrhoea, one from dysentery, four from cholera morbus, and two from typhoid fever, making a total of eleven cases of this class, goes far to show an improvement in the hitherto very unsatisfactory water supply; and, as the cost has not been great, the taxpayer should feel grateful to the commissioners who have executed the work.

House drainage and plumbing have also been greatly improved and only permitted under close inspection.

The city milk supply is not receiving the attention it should have. Looking after the butter fat it contains is not filling the bill. Tuberculous cows must be looked after, and the Veterinary Surgeon must be called in to the aid of the Board of Health, and all animals subjected to the tuberculin test, if we are to protect the public against drinking the milk of consumptive cows.

*Scarlet Fever* has been the most difficult disease to control this year. Being of a mild form, it insidiously crept about from concealed cases ; but in no instance, so far as I know, was it communicated from a case reported to the Board.

*Smallpox* in a most remarkable form made its appearance in the month of May. It was simply impossible to differentiate between it and chicken-pox in its early stages ; but after consultation with Dr. Hoare, M.H.O. of Walkerville and Sandwich East, we agreed that the proper thing to do was to drop the scientific question as to what disease it was, and protect the public by placing all persons affected with it within the three municipalities in the isolation hospital. We disinfected every house where the disease was ever suspected and vaccinated all persons in the various neighborhoods. This was done at a time when the Christian Endeavor Society was being quartered in Windsor. Our efforts were completely successful in stamping out the disease, the community was saved from the terror which otherwise would have seized upon it, and commerce was not disturbed as it generally is when newspapers herald under scare headlines the presence of smallpox. Four cases from Windsor, one from Walkerville and fifteen from Sandwich East were cared for at the hospital, and Windsor's share of their maintenance, including medical attendance, was \$78.35.

The Provincial Board of Health, realizing that smallpox was spreading in Essex, requested the different municipalities to issue vaccination proclamations, but owing to an oversight in the resolution, Windsor's proclamation was delayed.

Although there is perhaps no school population in the Dominion better vaccinated, yet there are hundreds of unvaccinated children under 5 years of age and many adults unprotected from smallpox ; and if the city is to be protected against an invasion, these children and those adults vaccinated in childhood should apply at once to their family physician or to the public vaccinators.

It is a subject of congratulation to the Board of Health and the Health Officers that your honorable body has established permanently the Isolation Hospital by purchasing the property on which the building is situated. More comfortable quarters can now be provided, and, instead of dreading it, the public will be glad to avail themselves of the benefits of isolation.

Mr. Grieve, the Inspector, has been most indefatigable in his efforts to abate nuisances, inspect house drains and plumbing, and in ministering to the comforts of the patients in the hospital.

In conclusion, I thank the members of the Board of Health for their cordial assistance in dealing with all matters brought under their notice.

Very respectfully,

JNO. COVENTRY,

Medical Health Officer.

#### *Contagious Diseases.*

Some physicians report every case of contagious diseases, while others, I understand, having reported one case in a family, deem it unnecessary to inform this office of subsequent cases in the same family occurring while the placard is still upon the residence and the clearance preparatory to the disinfection has not been issued. It may therefore be found that the figures following do not represent the precise number of cases that have occurred within the year. Forty-eight cases of scarlet fever have been reported, seventeen of diphtheria, and one of small pox. It may be interesting to know at what

period of the year these diseases most largely prevailed, and therefore I have arranged them by months, as follows :

	Diphtheria.	Scarlet Fever.	Small Pox.
Occurring in January.....	3	1	...
" " February.....	..	4	..
" " March.....	..	14	1
" " April.....	..	9	..
" " May.....	1	1	..
" " June.....	..	4	..
" " July.....	1	1	..
" " August.....	..	3	..
" " September.....	1	5	..
" " October.....	4	1	..
" " November.....	5	3	..
" " December.....	2	2	..
Total.....	17	48	1

Doubtless to circumvent the caterers to sensational newspapers, the five cases of small pox that occurred in July and August were not reported to this office, but the patients were taken direct to the hospital and released therefrom privately, so that few citizens and no outsiders were aware of the circumstances, and no alarm was created at home or abroad. While the public health was amply safeguarded, the business interests of the city were not permitted to be jeopardized, as otherwise might have happened. The Medical Health Officer will, in his annual report, furnish all detail in respect to these small pox cases that can be desired.

*Sanitary Work.* In February last a contract was entered into with J. E. Hillman for gathering and carting to the dumping ground the winter's accumulation of rubbish and garbage from private premises and public alleys, and further to keep the alleys clean up to the first of November; and the work was done in a very satisfactory manner at a cost of \$305.00. The almost universal use of natural gas as fuel contributes largely to the expense of this work, as all waste paper and other materials alike in business places and private houses, that formerly were consumed in stoves, are now necessarily deposited in receptacles or thrown into yards and alleys, to be hauled away at public expense.

A good deal of improvement has this year been made in the city by the erection of some extensive business structures and many dwellings of a superior class, in all which cases modern ideas as to plumbing and drainage have been given full scope. Progress has also been marked in respect to the betterment of old buildings in the same direction, no less than seventy new sewer connections having been made therefrom under the supervision of the Sanitary Inspector.

Under the health by-law no privy vault is allowed after January 1st next upon premises having a legal right to drainage in a public sewer; and in anticipation of that regulation being enforced, hopper closets have this year been substituted for vaults to the number of sixty-seven, and the promise is that the ensuing season will witness a general movement in that direction. The number of vaults cleaned up to date is four hundred and seventy-five.

The expenditure of the board for all purposes up to the first instant has reached \$1,799.68, exceeding the estimates by \$299.68. But a very material part of the disbursements, probably not less than \$390.00, was unforeseen and necessitated by the appearance of small pox in the city. However the apparent deficit is nearly covered by a bill against Sandwich East which will shortly be paid to the city treasurer amounting to \$274.02, and another against Walkerville for \$13.86, being the proportion of hospital expenses those municipalities agreed to pay in consideration of the admission of their small pox patients.

Owing to the prevalence of small pox in the townships of Tilbury, Rochester and Maidstone, and the seeming laxity on the part of the authorities there in the matter of vaccination and isolation, in the earlier days of the outbreak, coupled with the constant communication going on between the people of those municipalities and this city, the Windsor council instructed the mayor to proclaim section 15 of the "Act respecting Vaccination and Inoculation" in force, and appointed four physicians to vaccinate all residents requiring that operation. The outcome of this precautionary measure should be the thorough protection of our citizens; and the Provincial Health Officers having assumed control of the disease in the townships named, affords the further guarantee that the dreaded disease will not now be permitted to come our way from that quarter.

*Milk Supply.* The number of licenses issued this year to milk vendors is 34, and the number of cows furnishing the supply, so far as can be ascertained, is 469, one vendor alone selling the product of 150 cows which are owned by different farmers in the townships of Sandwich East, South and West. The inspector has examined 25 byres containing 225 cows, and found the premises generally in good condition and the animals well fed and watered. A decided improvement over former inspections was observed in nearly every case.

No test in the quality of the milk sold has been made so far.

*Sanitary Condition.* Notwithstanding the comparatively large number of cases of contagious diseases that have been reported, the sanitary condition of the city is undoubtedly good.

It is undeniable that the spread of scarlet fever was caused by concealment, through ignorance or by design, of one or two cases in the early part of the year, and patients allowed to mingle with other children in the public schools. Parents guilty of such conduct should be made to feel the full weight of the law. The trouble, worry and expense this inflicted upon the public at large, can hardly be estimated.

With the prospect of an early substitution of Macadam pavements for the worn-out and dangerous cedar pavements, the outlook for the city's health is much brighter than hitherto; and this board, by every means within its power, should encourage and strengthen the hands of those public men who have lent their energies towards providing the city with healthful thoroughfares to supplement our ample and efficient system of sewers.

All of which is respectfully submitted.

STEPHEN LUSTED,

Secretary.

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## Summary of Annual Reports to the Provincial

ABBREVIATIONS: Sp., Smallpox; S., Scarlatina;

	ALGOMA.		BRANT.		BRUCE.	
	General in- spection. 2	On com- plaint. 12	General in- spection. 5	On com- plaint. 1	General in- spection. 13	On com- plaint. 11
Is there general sanitary inspection? or is action taken only when complaint of nuisance is made to Board?						
Contagious diseases ....	Cases. Deaths.	Cases. Deaths.	Cases. Deaths.	Cases. Deaths.	Cases. Deaths.	Cases. Deaths.
	Sp ..... 2	Sp ..... 2	Sp ..... 159	Sp ..... 5	Sp ..... 72	Sp ..... 4
	S ..... 2	S ..... 2	S ..... 77	S ..... 7	S ..... 61	S ..... 12
	Dip ..... 27	Dip ..... 3	Dip ..... 175	Dip ..... 14	Dip ..... 44	Dip ..... 6
	Ty ..... 3	Ty ..... 3	Ty ..... 40	Ty ..... 40	Ty ..... 36	Ty ..... 36
	Tubis .. 10	Tubis .. 4	Tubis .. 5	Tubis .. 1	Tubis .. 18	Tubis .. 2
	Yes ..... 1	No ..... 4	Yes ..... 1	No ..... 1	Yes ..... 1	No ..... 2
Is isolation of contagious diseases systematically carried out? Is there any isolation hospital?	Hospital. 1	Hospital. 1	Hospital. 1	Hospital. 1	Hospital. 1	Hospital. 1
Is diphtheria anti-toxine in common use by physicians?	Yes .... 2	No ..... 6	Yes .... 2	No ..... 1	Yes .... 11	No ..... 3
Is disinfection after contagious diseases carried out under personal supervision of an officer of Board?	Yes .... 11	No ..... 4	Yes .... 5	No ..... 1	Yes .... 18	No ..... 3
(a) Does Board make systematic inspection of public schools? (b) Does it require a certificate of vaccination from new school children each year?	(a) Yes.. 3	(a) No .. 12	(a) Yes.. 3	(a) No .. 4	(a) Yes .. 8	(a) No .. 13
	(b) Yes.. 1	(b) No .. 5	(b) Yes.. 1	(b) No .. 3	(b) Yes.. 1	(b) No .. 17
Are forms for notification by teachers and M. H. O. of contagious diseases supplied?	Yes .... 4	No ..... 9	Yes .... 4	No ..... 2	Yes .... 14	No ..... 5
Give source of water supply used on premises.	Wells ... 17	Water-works. 1	Wells.... 6	Water-works.. 1	Wells.... 20	Water-works.. 1
(a) Is there systematic inspection of dairy cows made during the year? (b) Have cases of tuberculosis been found on inspection?	(a) Yes.. 1	No ..... 19	(a) Yes.. 3	(a) No .. 3	(a) Yes.. 3	(a) No .. 15
	(b) Yes.. 1	No ..... 13	(b) Yes.. 1	(b) No .. 2	(b) Yes.. 1	(b) No .. 1
How many slaughter-houses in municipality? Are they licensed on evidence of being kept in good sanitary condition? Is there systematic inspection by any officer of the Board?	Slaughter-houses. 7	Licensed. .. Inspected 1	Slaughter-houses. 4	Licensed. .. Inspected 1	Slaughter-houses. 8	Licensed. 3 Inspected 5
Is there systematic removal of garbage and night soil?	Yes .... 2	No ..... 10	Yes .... 2	No ..... 3	Yes .... 5	No ..... 10
Is there a public sewerage system?	Yes .... 2	No ..... 16	Yes .... 2	No ..... 3	Yes .... 2	No ..... 17
Number of municipalities having noxious trades. (See Sec. 63, Public Health Act)	Number with. 1	Number without. 17	Number with. 1	Number without. 5	Number with. 2	Number without. 22
Have there been prosecutions during year under Public Health Act?	None.....	None.....	None ..	None ..	1 .....	None.....
Number of municipalities reporting?	18.....	18.....	5 .....	5 .....	24.....	24.....

## Board of Health of Municipalities by Counties.

Dip., *Diphtheria* ; Ty., *Typhoid* ; Tubis., *Tuberculosis*.

CARLETON.		DUFFERIN.		ELGIN.		ESSEX.	
General in- spection. 2	On com- plaint. 6	General in- spection. 2	On com- plaint. 3	General in- spection. 4	On com- plaint. 1	General in- spection. 6	On com- plaint. 8
Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Sp ..... 176	Sp ..... 5	Sp ..... 23	Sp ..... 1	Sp ..... 80	Sp ..... 1	Sp ..... 138	Sp ..... 2
S ..... 105	Dip ..... 31	S ..... 8	Dip ..... 8	S ..... 20	Dip ..... 4	S ..... 95	Dip ..... 18
Ty ..... 233	Ty ..... 37	Ty ..... 21	Ty ..... 1	Ty ..... 6	Ty ..... 2	Ty ..... 31	Ty ..... 3
Tubis ..... 135	Tubis ..... 135	Tubis ..... 7	Tubis ..... 6	Tubis ..... 32	Tubis ..... 32	Tubis ..... 43	Tubis ..... 29
Yes ..... 9	No ..... 1	Yes ..... 6	No ..... 1	Yes ..... 3	No ..... 4	Yes ..... 11	No ..... 1
Hospital. 2	Hospital. ..	Hospital. ..	Hospital. ..	Hospital. 1	Hospital. ..	Hospital. 2	Hospital. ..
Yes .... 6	No .... 1	Yes .... 4	No .... 1	Yes .... 2	No ..... 1	Yes .... 10	No ..... 1
Yes .... 9	No ..... 2	Yes .... 5	No ..... 2	Yes .... 1	No ..... 1	Yes .... 10	No ..... 1
(a) Yes... ..	(a) No... 10	(a) Yes... 1	(a) No... 6	(a) Yes... 2	(a) No... 2	(a) Yes... 7	(a) No... 6
(b) Yes... ..	(b) No... 9	(b) Yes... ..	(b) No... 5	(b) Yes... 1	(b) No... 3	(b) Yes... 3	(b) No... 6
Yes .... 3	No ..... 5	Yes ..... 4	No ..... 3	Yes .... 1	No ..... 3	Yes .... 10	No ..... 3
Wells ... 10	Water-works. 1	Wells .... 6	Water-works. 2	Wells ... 4	Water-works.. 1	Wells ... 10	Water-works.. 4
(a) Yes.. 1	(a) No... 8	(a) Yes.. ..	(a) No... 7	(a) Yes.. 1	(a) No... 3	(a) Yes.. 2	(a) No... 7
(b) Yes . 1	(b) No... 3	(b) Yes.. ..	(b) No... ..	(b) Yes.. ..	(b) No... 3	(b) Yes.. 2	(b) No... 6
Slaughter-houses. 9	Licensed. 1 Inspected 1	Slaughter-houses. 28	Licensed. .. Inspected...	Slaughter-houses. 2	Licensed. .. Inspected...	Slaughter-houses. 21	Licensed. .. Inspected...
Yes .... 4	No ..... 6	Yes ..... 1	No ..... 5	Yes .... 2	No ..... 2	Yes .... 3	No .... 8
Yes .... 2	No ..... 8	Yes ..... ..	No ..... 7	Yes .... 2	No ..... 2	Yes .... 1	No ..... 12
Number with. 4	Number without. 7	Number with. 1	Number without. 6	Number with. 1	Number without. 3	Number with. 5	Number without. 10
13.....	.....	None.....	.....	28.....	.....	1.....	.....
11.....	.....	7.....	.....	4.....	.....	15.....	.....

## Summary of Annual Reports to the Provincial

ABBREVIATIONS : Sp., Smallpox ; S. Scarlatina ;

	FRONTENAC.		Grey.		Haldimand.	
	General inspection	On complaint. 3	General inspection. 3	On complaint. 11	General inspection. 5	On complaint. 8
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Is there general sanitary inspection? or is action taken only when complaint of nuisance is made to Board?						
Contagious diseases ....	Sp ..... 356 S ..... 34 Dip ..... 22 Ty ..... 46 Yes ..... 5 Hospital. 3	Sp ..... 15 S ..... 5 Dip ..... 6 Ty ..... 46 No ..... 3	Sp ..... 9 S ..... 14 Dip ..... 1 Ty ..... 16 Yes ..... 10 Hospital. 1	Sp ..... 2 S ..... 10 Dip ..... 2 Ty ..... 14 No ..... 2	Sp ..... 3 S ..... 28 Dip ..... 29 Ty ..... 9 Yes ..... 6 Hospital. .	Sp ..... S ..... Dip ..... 2 Ty ..... 2 Tubis ..... 9 No ..... 3
Is isolation of contagious diseases systematically carried out? Is there any isolation hospital?	Yes .... 7	No ..... 2	Yes .... 6	No ..... 4	Yes .... 7	No ..... .
Is diphtheria anti-toxine in common use by physicians?	Yes .... 5	No ..... 5	Yes .... 10	No ..... 1	Yes .... 4	No ..... 2
Is disinfection after contagious diseases carried out under personal supervision of an officer of Board?	(a) Yes.. 3 (b) Yes.. .	(a) No .. 7 (b) No .. 3	(a) Yes.. 3 (b) Yes.. .	(a) No .. 9 (b) No .. 4	(a) Yes.. 3 (b) Yes.. .	(a) No .. 6 (b) No .. 6
Are forms for notification by teachers and M. H. O. of contagious diseases supplied?	Yes .... 3	No ..... 7	Yes .... 9	No ..... 5	Yes .... 2	No ..... 4
Give source of water supply used on premises.	Wells ... 7	Water-works.. 1	Wells ... 11	Water-works.. 1	Wells ... 7	Water-works.. 1
(a) Is there systematic inspection of dairy cows made during the year?	(a) Yes.. 2	(a) No .. 7	(a) Yes.. 1	(a) No .. 5	(a) Yes.. 1	(a) No .. 6
(b) Have cases of tuberculosis been found on inspection?	(b) Yes.. 1	(b) No .. 4	(b) Yes.. .	(b) No .. .	(b) Yes.. .	(b) No .. 7
How many slaughter-houses in municipality?	Slaughter-houses. 17	Licensed .. Inspected ..	Slaughter-houses. 18	Licensed .. Inspected 4	Slaughter-houses. 9	Licensed. Inspected 2
Are they licensed on evidence of being kept in good sanitary condition? Is there systematic inspection by any officer of the Board?	Yes .... 2	No ..... 10	Yes .... 1	No ..... 10	Yes .... 1	No ..... 6
Is there systematic removal of garbage and night soil?	Yes .... 1	No ..... 8	Yes .... 1	No ..... 13	Yes .... 1	No ..... 6
Is there a public sewerage system?	Number with... 2	Number without 9	Number with... 3	Number without. 11	Number with. .	Number without. 8
Number of municipalities having noxious trades. (See sec. 63, Public Health Act).	One .....		Two .....		None .....	
Have there been prosecutions during year under Public Health Act?	11 .....		14 .....		8 .....	
Number of municipalities reporting?						

## Board of Health of Municipalities by Counties.

Dip., *Diphtheria* ; Ty., *Typhoid* ; Tubis., *Tuberculosis*.

Hastings.		Halton.		Haliburton.		Huron.	
General in- spection. 5	On com- plaint. 9	General in- spection. 2	On com- plaint. 3	General in- spection. 1	On com- plaint. 2	General in- spection. 6	On com- plaint. 11
Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Sp ..... 191	Sp ..... 7	Sp ..... 1	Sp ..... 1	Sp ..... 1	Sp ..... 1	Sp ..... 42	Sp ..... 9
Dip ..... 12	Dip ..... 1	Dip ..... 1	Dip ..... 1	Dip ..... 1	Dip ..... 1	Dip ..... 9	Dip ..... 2
Ty ..... 17	Ty ..... 1	Ty ..... 7	Ty ..... 1	Ty ..... 4	Ty ..... 1	Ty ..... 39	Ty ..... 1
Tubis ... 12	Tubis ... 11	Tubis ... 1	Tubis ... 1	Tubis ... 2	Tubis ... 1	Tubis ... 38	Tubis ... 37
Yes ..... 8	No ..... 7	Yes ..... 3	No ..... 1	Yes ..... 2	No ..... 1	Yes ..... 10	No ..... 6
Hospital. 1		Hospital. ..		Hospital. ..		Hospital. ..	
Yes .... 7	No ..... 1	Yes .... 2	No ..... 1	Yes .... 2	No ..... 1	Yes .... 6	No ..... 4
Yes .... 7	No ..... 6	Yes .... 1	No ..... 1	Yes .... 2	No ..... 1	Yes .... 11	No ..... 5
(a) Yes.. 4	(a) No.. 9	(a) Yes.. 1	(a) No.. 1	(a) Yes.. 1	(a) No.. 3	(a) Yes.. 7	(a) No.. 10
(b) Yes.. ..	(b) No.. 7	(b) Yes.. ..	(b) No.. 1	(b) Yes.. ..	(b) No.. 3	(b) Yes.. 4	(b) No.. 10
Yes .... 1	No ..... 6	Yes .... ..	No ..... 2	Yes .... ..	No ..... 3	Yes .... 5	No ..... 12
Wells ... 10	Water works. 1	Wells ... 4	Water- works. ..	Wells ... 4	Water- works. ..	Wells ... 15	Water- works. ...
(a) Yes.. 1	(a) No.. 13	(a) Yes.. 1	(a) No.. 2	(a) Yes.. ..	(a) No.. 2	(a) Yes.. 2	(a) No.. 12
(b) Yes.. 1	(b) No.. 7	(b) Yes.. ..	(b) No.. 2	(b) Yes.. ..	(b) No.. 2	(b) Yes.. ..	(b) No.. ..
Slaughter- houses. 29	Licensed 2 Inspected 2	Slaughter- houses. 25	Licensed. .. Inspected ..	Slaughter- houses. 1	Licensed. .. Inspected ..	Slaughter- houses. 20	Licensed. 2 Inspected 2
Yes .... 2	No ..... 11	Yes .... ..	No ..... 3	Yes .... ..	No ..... 2	Yes .... 1	No ..... 13
Yes .... 2	No ..... 13	Yes .... ..	No .... 4	Yes .... ..	No ..... 3	Yes .... 2	No ..... 13
Number with. 7	Number without. 8	Number with. 2	Number without. 2	Number with. ..	Number without. 4	Number with. ..	Number without. 20
None .....		None .....		None .....		Two .....	
15 .....		4 .....		4 .....		20 .....	



## Summary of Annual Reports to the Provincial

ABBREVIATIONS : Sp., *Smallpox* ; S., *Scarlatina* ;

	KENT.		LAMBTON.		LANARK.	
	General inspection.	On complaint.	General inspection.	On complaint.	General inspection.	On complaint.
Is there general sanitary inspection? or is action taken only when complaint of nuisance is made to Board?						
Contagious diseases.....	Cases. 2 Sp ..... 23 S ..... 24 Dip ..... 25 Ty ..... 23 Tubis ..... 23 Yes ..... 7 Hospital....	Deaths. 2 Sp ..... 2 S ..... 3 Dip ..... 7 Ty ..... 23 Tubis ..... 2 No ..... 2	Cases. 2 Sp ..... 54 S ..... 93 Dip ..... 42 Ty ..... 25 Tubis ..... 11 Yes ..... 1	Deaths. 4 Sp ..... 2 S ..... 2 Dip ..... 5 Ty ..... 19 Tubis ..... 1	Cases. 2 Sp ..... 18 S ..... 12 Dip ..... 10 Ty ..... 7 Tubis ..... 7 Yes ..... 7 Hospital....	Deaths. 9 Sp ..... 18 S ..... 12 Dip ..... 3 Ty ..... 7 Tubis ..... 1 No ..... 1
Is isolation of contagious diseases systematically carried out? Is there any isolation hospital?						
Is diphtheria anti-toxine in common use by physicians?	Yes..... 7	No.....	Yes..... 8	No.....	Yes..... 4	No.....
Is disinfection after Contagious diseases carried out under the personal supervision of an officer of the Board?	Yes..... 4	No.....	Yes..... 9	No..... 1	Yes..... 4	No..... 4
(a) Does the Board make systematic inspection of the public schools? (b) Does it require a certificate of vaccination from new school children each year?	(a) Yes.... 4 (b) Yes.... 1	(a) No.... 6 (b) No.... 8	(a) Yes.... 5 (b) No.... 1	(a) No .... 9 (b) No .... 9	(a) Yes.... 1 (b) Yes.... 1	(a) No.... 8 (b) No.... 8
Are forms for Notification by Teachers and M. H. O. of Contagious Diseases supplied?	Yes..... 3	No..... 4	Yes..... 6	No..... 4	Yes..... 0	No..... 6
Give source of Water supply used on premises.	Wells ..... 9	Water-works... 1	Wells ..... 11	Water-works... 2	Wells ..... 8	Water-works... 8
(a) Is there systematic inspection of Dairy Cows made during the year? (b) Have cases of tuberculosis been found on inspection?	(a) Yes.... (b) Yes....	(a) No.... 8 (b) No.... 7	(a) Yes.... 2 (b) Yes....	(a) No.... 10 (b) No.... 10	(a) Yes.... 1 (b) Yes.... 1	(a) No.... 8 (b) No.... 8
How many slaughter-houses in Municipality? Are they licensed on evidence of being kept in good sanitary condition? Is there systematic inspection by any officer of the Board?	Slaughter-houses. 14	Licensed... 1 Inspected... 1	Slaughter-houses. 28	Licensed... 1 Inspected...	Slaughter-houses. 5	Licensed... Inspected...
Is there systematic removal of Garbage and Night Soil?	Yes..... 3	No..... 6	Yes..... 5	No..... 6	Yes..... 1	No..... 9
Is there a 'public sewerage system?	Yes.....	No..... 9	Yes..... 3	No..... 10	Yes.....	No..... 3
Number of Municipalities having Noxious Trades. (See Sec. 63, Public Health Act).	Number with without. 9	Number without. 9	Number with... 1 without. 13	Number without. 13	Number with.... 2 without. 8	Number without. 8
Have there been prosecutions during year under Public Health Act?	None.....		None.....		None.....	
Number of Municipalities reporting.	9.....		14.....		10.....	

## Board of Health of Municipalities by Counties.

Dip., *Diphtheria*; Ty., *Typhoid*; Tubis., *Tuberculosis*.

LEEDS AND GRENVILLE.		LENNOX AND ADDINGTON.		LINCOLN.		MIDDLESEX.	
General in- spection 4	On com- plaint. 12	General in- spection. 4	On com- plaint. 5	General in- spection. 8	On com- plaint. 8	General in- spection. 5	On com- plaint. 10
Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Sp ..... 5	Sp ..... 2	Sp ..... 2	Sp ..... 4	Sp ..... 163	Sp ..... 3	Sp ..... 238	Sp ..... 13
S ..... 51	S ..... 6	S ..... 9	S ..... 4	S ..... 37	S ..... 8	S ..... 113	S ..... 18
Dip ..... 55	Dip ..... 1	Dip ..... 7	Dip ..... 1	Dip ..... 13	Dip ..... 8	Dip ..... 87	Dip ..... 7
Ty ..... 11	Ty ..... 1	Ty ..... 4	Ty ..... 1	Ty ..... 32	Ty ..... 30	Ty ..... 80	Ty ..... 78
Tubis ..... 51	Tubis ..... 45	Tubis ..... 15	Tubis ..... 13	Tubis ..... 7	Tubis ..... 9	Tubis ..... 9	Tubis ..... 2
Yes ..... 7	No ..... 7	Yes ..... 8	No ..... 6	Yes ..... 1	No ..... 1	Yes ..... 10	No ..... 1
Hospital ..... 1	No ..... 2	Hospital ..... 5	No ..... 1	Hospital ..... 6	No ..... 2	Hospital ..... 8	No ..... 4
Yes ..... 6	No ..... 2	Yes ..... 5	No ..... 1	Yes ..... 5	No ..... 1	Yes ..... 10	No ..... 1
Yes ..... 7	No ..... 5	Yes ..... 5	No ..... 1	Yes ..... 6	No ..... 2	Yes ..... 8	No ..... 4
(a) Yes ..... 2	(a) No ..... 10	(a) Yes ..... 1	(a) No ..... 8	(a) Yes ..... 3	(a) No ..... 6	(a) Yes ..... 4	(a) No ..... 9
(b) Yes ..... 1	(b) No ..... 12	(b) Yes ..... 1	(b) No ..... 7	(b) Yes ..... 1	(b) No ..... 7	(b) Yes ..... 1	(b) No ..... 10
Yes ..... 3	No ..... 8	Yes ..... 1	No ..... 5	Yes ..... 4	No ..... 4	Yes ..... 6	No ..... 3
Wells ..... 10	Water-works ..... 2	Wells ..... 5	Water-works ..... 7	Wells ..... 6	Water-works ..... 3	Wells ..... 7	Water-works ..... 1
(a) Yes ..... 1	(a) No ..... 10	(a) Yes ..... 1	(a) No ..... 7	(a) Yes ..... 1	(a) No ..... 8	(a) Yes ..... 1	(a) No ..... 16
(b) Yes ..... 1	(b) No ..... 7	(b) Yes ..... 1	(b) No ..... 6	(b) Yes ..... 1	(b) No ..... 8	(b) Yes ..... 1	(b) No ..... 16
Slaughter-houses. 11	Licensed ... Inspected ..	Slaughter-houses. 8	Licensed .. Inspected ..	Slaughter-houses. 19	Licensed .. Inspected ..	Slaughter-houses. 12	Licensed .. Inspected ..
Yes ..... 1	No ..... 7	Yes ..... 2	No ..... 5	Yes ..... 2	No ..... 6	Yes ..... 2	No ..... 15
Yes ..... 1	No ..... 10	Yes ..... 1	No ..... 7	Yes ..... 1	No ..... 8	Yes ..... 1	No ..... 8
Number with ..... 3	Number without. 11	Number with ..... 9	Number without. 9	Number with ..... 9	Number without. 9	Number with ..... 6	Number without. 6
None ..... 14	One ..... 9	None ..... 9	One ..... 16	None ..... 16	One ..... 16	None ..... 16	One ..... 16

